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THE EMPLOYMENT OF THE DIVISION ARTILLERY GROUP
AT THE NATIONAL TRAINING CENTER

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

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B.A., Virginia Military Institute, Lexington, Virginia, 1983

Fort Leavenworth, Kansas
1996

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MASTER OF MILITARY ART AND SCIENCE

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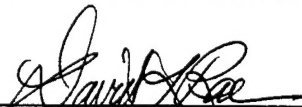
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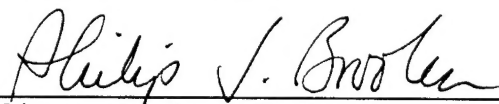
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ABSTRACT

THE EMPLOYMENT OF THE DIVISION ARTILLERY GROUP AT THE NATIONAL TRAINING CENTER by MAJ Mark L. Waters, USA.

This study examines how the OPFOR's Division Artillery Group (DAG) influences brigade fire support and maneuver training at the NTC. The purpose is to determine whether the NTC should discontinue use of the DAG and, if so, recommend viable alternatives which are consistent with doctrine yet maximize the NTC training experience. The study assesses the DAG's utility as a training vehicle by comparing DAG employment at the NTC to former Soviet and U.S. doctrine and by measuring the effect of DAG fires on the performance of brigade combat teams.

The conclusion is that the DAG should remain on the NTC battlefield but the training scenarios should be scripted to include a division proactive counterfire battle designed to reduce the DAG to a strength level which leaves the brigade with sufficient combat power to practice close assault tasks.

The study shows that the DAG is correctly portrayed in terms of tube strength and positioning but contributes too heavily to the close fight. Other than the division's reactive counterfire battle, the brigade has no means of countering DAG fires. Introducing proactive counterfire retains the current NTC threat model, advances existing, sound doctrine, and increases the training value to the brigade combat team.

ACKNOWLEDGEMENTS

While waiting for a table in a local restaurant about eight months ago, I was perusing an old CGSC yearbook planted in the waiting area. In it was a quote offered by a former student which said something to the effect, whoever said that CGSC was the best year of your life never tried to tackle an MMAS. The thought is certainly not an original one and it proved prophetic.

Despite the long hours and frustration, however, the experience has indeed been a rewarding one. While the research fortunately accomplished its purpose, my gratitude goes to a magnificent committee whose technical expertise, patience and firmness made this project possible. My thanks go to Dr. Bruce Menning, the committee chair, who provided me with superb guidance from beginning to end. LTC Richard T. Lambert provided the necessary matchless technical scrutiny and a great deal of mentorship for this work. LTC David L. Rae, who doubled as my academic advisor, was never lacking in technical advice or encouragement.

My thanks to my wonderful family. What could have been a year of road trips, weekend fun, and quality time was too often spoiled by my desire to see this project through to the end. In return, my wife and children only provide love, embraces and more understanding than I deserved.

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LIST OF ABBREVIATIONS

ACR	Armored Cavalry Regiment
BCTP	Battle Command Training Program
BLUFOR	Blue Forces
BMP	OPFOR Armored Infantry Vehicle
BOS	Battle Operating System
CAA	Combined Arms Army
COG	Chief, Operations Group
CTC	Combat Training Center
DAG	Division Artillery Group
DATK	Deliberate Attack
DIVARTY	Division Artillery
FSE	Forward Security Element
IFCAS	Indirect Fire Casualty Assessment Box
LD	Line of Departure
MLRS	Multiple Launch Rocket System
MRB	Motorized Rifle Battalion
MRD	Motorized Rifle Division
NAI	Named Area of Interest
NTC	National Training Center
OPFOR	Opposing Force
RAG	Regimental Artillery Group
TAF	Training Analysis Facility
TRADOC	Training and Doctrine Command

CHAPTER 1

INTRODUCTION

The Problem

This thesis is an examination of how the Division Artillery Group (DAG) influences brigade fire support and maneuver training at the National Training Center (NTC). The purpose of this examination is to review and analyze the methods which the NTC employs and engages the DAG and to provide the assessment of how the DAG can impact negatively on rotational unit training objectives. The objective is to propose alterations to alleviate negative impact.

At the NTC, the DAG is a notional, computerized array of icons representing a battalion of cannon artillery and a battalion of rocket artillery. The role of the DAG is to replicate an opposing force's division asset in support of a secondary effort opposing force (OPFOR) regiment in a friendly (BLUFOR) brigade combat team's zone. As a motorized rifle division commander's asset, the DAG is a legitimate part of the NTC threat scenario model, yet the conditions and methods under which the OPFOR employs the DAG raise issues concerning its doctrinal fidelity. As a general support asset capable of providing both close support and counterbattery fires for the division, the DAG's fires should be doctrinally focused on the main effort regiment's strike sector. However, during BLUFOR deliberate attacks in secondary OPFOR sectors, the DAG is often employed in a close support role which has resulted in BLUEFOR maneuver attrition rates sometimes exceeding 50 percent¹. These losses usually occur before the lead task force enters OPFOR direct fire range, an outcome effectively precluding the execution

of critical maneuver tasks which serve as the index of maneuver combat readiness². Worse, the NTC's fire support training analysis facility (TAF), which functions in a limited BLUFOR role as the brigade's higher division headquarters, fails to plan and execute deep operations against the DAG which would otherwise mitigate its effects and thus set the conditions for a successful brigade close fight. An additional complicating factor is that the brigade simply is not resourced in manpower or equipment to handle counterbattery and counterfire along with the weighty responsibility of synchronizing close fire support with maneuver.

Significance

The significance of this study lies in its implications for combat readiness. First, readiness dictates that the U.S. Army understands an OPFOR style enemy and that the OPFOR portrays an accurate picture of that enemy at the Combat Training Centers (CTCs). An analysis of the NTC OPFOR threat model is instructive in understanding the capabilities and employment of Russian artillery and the artillery of nations based on the former Soviet model. With an understanding of the conditions and criteria, or norms, by which the OPFOR employs its artillery, U.S. leaders and trainers can more intelligently develop ways and means of countering its tremendous destructive capability within the context of friendly operational and tactical objectives. Second, and strongly correlated with the first point, is the realization that lessons learned from NTC OPFOR artillery employment have a profound influence on future training. The wrong lesson derived from an NTC experience perpetuates wrong or inappropriate tactics, techniques, and procedures.

Combat readiness requires that Army personnel become thoroughly familiar with potential enemies' weapons systems and how they are

employed. Understanding the composition and employment criteria for the DAG, for example, enables the BLUEFOR to develop measures for proactively seeking to destroy it (counterfire) or to return fire once the DAG is acquired (counterbattery). Since OPFOR artillery is allocated and employed according to a stringent set of quantitative norms, knowledge of these norms allows the BLUEFOR to accurately predict the number of weapons systems in the DAG or Regimental Artillery Group (RAG), when they will fire, and the number rounds they will fire based on the OPFOR mission and the OPFOR unit's corresponding frontage.³ Because the DAG's doctrinal function is both to employ counterbattery fires, scatterable mines, and chemicals and to assist the main effort regiment with close support fires, the DAG's purpose at NTC is to train rotational brigades in anticipating the effects of DAG fires. For training fidelity, the DAG's battlefield signature must be consistent with its doctrine.

The issue is important because the lessons learned at the NTC, right or wrong, become the blueprint for Army wide training. How the NTC portrays and employs the DAG and the conditions that NTC sets for the rotational brigade to conduct its close fight impact on how the brigade will structure its maneuver and fire support integrated training. Deviation from a common doctrine for DAG employment creates a false picture for brigade staffs and results in correspondingly incorrect BLUFOR reactions. Schooled in the precise Former Soviet (Krasnovian) doctrine of phased fires, the S2 (intelligence officer) anticipates a certain volume of fires by munition type at a time and place prescribed by doctrine. Since the DAG's fires are doctrinally focused in support of the main effort regiment, repeated BM-21 (multiple rocket launchers in the DAG) strikes on BLUFOR maneuver forces would normally indicate that the brigade is facing the OPFOR division's main effort and not the supporting effort regiment depicted in the NTC threat

model.⁴ The brigade may then attempt to shift its focus and resources from the close fight to a counterbattery effort that is habitually a division responsibility. An additional complication is the division's failure to inflict losses on the DAG, thus reducing it to a level at which it can no longer influence the brigade's fight. Because of the all-intrusive DAG, the brigade is often compelled to continue its fight at a combat strength level (below 70 percent) which normally precludes continuation of the mission. A long-term effect is that maneuver commanders lose confidence in the division's capabilities to inflict attrition on enemy long range artillery. In addition, commanders lose sight of the necessity to mass artillery; they emphasize instead its value as a suppressing asset. In a recent article in Armor magazine, one author stresses that artillery should be used to "suppress" to allow the maneuver to "get better firing positions."⁵ Since inception of the NTC, fire support experience has shown that artillery used to suppress results in piecemealing an invaluable combat multiplier, thereby dissipating mass and volume and placing the artillery at risk of being acquired. Improper lessons percolate through succeeding rotations of commanders and staffs, with the implication that the same lessons will have to be unlearned one day in a real theater of war. An inaccurate picture of OPFOR artillery in training creates additional difficulties which have to be overcome in a potential future war against an OPFOR style opponent.

Method

This study seeks to determine whether the DAG, as the NTC currently replicates and employs it, is a valid training tool with reference to doctrinal fidelity and training value to the brigade combat team. To this end, analysis focuses on former Soviet and U.S. artillery and fire support doctrine as the foundation for comparison and

assessment of the NTC's techniques and procedures when employing the DAG. The method rests on a step-by-step comparative analysis to establish, first, the DAG's fidelity on the NTC battlefield to DAG employment in actual Former Soviet doctrine. Then, the study matches the procedures that the notional division (52nd Infantry Division) employs to counter the DAG with divisional counterfire responsibilities stipulated in U.S. division deep battle doctrine. After establishing how the DAG operates and determining the NTC division's relative success or failure in countering the DAG threat, the study turns a critical eye to force protection tasks. At issue is which tasks are relegated to the brigade combat team, and whether this team possesses the resource and firepower capability to meet that threat. Finally, the study measures quantitatively how the DAG's fires affect the brigade's ability to continue the close fight and practice the critical combat maneuver tasks of the close assault. Analysis based on this compare, match, measure methodology forms the basis for assessing the validity of DAG employment within the context of the NTC training mission.

Sources

The basis for research rests on a mixture of primary and secondary materials, including sources on Soviet artillery doctrine, U.S. Army professional journals and periodicals, U.S. Army doctrinal manuals, and NTC take home packets.

Since the NTC's Krasnovian DAG is based on the Former Soviet artillery threat model, doctrinal sources necessarily predate the 1989 fall of Soviet communism and subsequent reduction of forces in Eastern Europe. The research focus is on Former Soviet doctrinal works published in the late 1970s through the 1980s. Since U.S. Army heavy forces' threat doctrine is still based on the former Soviet model,

periodicals and manuals from the mid-1980s to the present provide a rich trove of materials.

Primary sources include NTC after action rotation reports, hereafter referred to as "take home packets;" research papers and memoranda published at the NTC regarding OPFOR weapons systems employment; and interviews with former members of the 11th Armored Cavalry Regiment (ACR), the NTC's OPFOR and the fire support TAF. The take home packets (THPs) are a compilation of units' strengths and weaknesses organized with reference to the Battle Operating Systems (BOS). These packets consist of observer-controller (OC) narrative observations and "raw" data feedback. The best empirical data is contained in the OPFOR's records of fire and the TAF's mission logs. The OPFOR records of fire indicate precisely the firing units, volume and time of fire, and the specific targets listed by combat vehicle bumper number the artillery attack has "vectored" or destroyed. Records of fire provide the best picture of how the DAG is employed and its attrition of BLUFOR maneuver forces. The TAF's mission logs, prepared in painstaking detail, also convey fire mission data by unit, time of opening fire, munition, volume of fire, and effects. On the basis of these materials, it is possible to evaluate how effectively a unit planned and employed its indirect fire systems. In addition, a number of decision papers, fact sheets, and memoranda have been passed between the 11th ACR and NTC Operations Group; and these materials discuss the employment of various notional or simulated weapons systems. They also provide insight into the processes that NTC planners employ to represent an accurate threat training tool to the player units, with the all-important goal of "achieving maximum training benefit to the player brigade."⁶ Interviews with former 11th ACR officers, TAF members, and rotational players comprise additional materials which not only show the methods and procedures that lend structure to the typical rotation but

also afford perspective into the NTC dynamic that reflects the conflict between the requirements for doctrinal authenticity and the necessity for victory on the NTC battlefield.

Key Terms

Counterfire. Fire intended to destroy or neutralize enemy weapons (JCS Pub 1). Counterfire involves the targeting and attack of the enemy's total fire support system across the battlefield. It is either proactive or reactive (FM 6-20-2, Corps Artillery, Division Artillery and Field Artillery Brigade Headquarters).

1) Reactive counterfire. Hereafter referred to as "counterbattery," the BLUEFOR fire support system as it responds to enemy indirect fires which are inflicting damage on friendly forces (FM 6-20-2).

2) Proactive counterfire. All actions taken to destroy or neutralize an enemy fire support system before it inflicts damage on friendly forces (FM 6-20-2).

Regimental Artillery Group (RAG). A temporary, mission oriented grouping of two to four artillery battalions which provide fire support to first echelon regiments and battalions.

Division Artillery Group (DAG). A temporary, mission oriented grouping of six to eight battalions which provides supporting fires to the division and "assists the army with the counterbattery mission, and when possible, performs the counterbattery mission itself (TRADOC Pam 350-16).

Training Analysis Facility (TAF) at the NTC. The fire support TAF has the responsibility of monitoring fire support planning and execution for the purpose of providing feedback for after action reviews. Another TAF function is to replicate some of the division's fire support element's functions, to include counterfire.

Limitations

Because the thrust of this thesis is to evaluate how DAG employment impacts on the training of brigade combat teams, limitations inherent in research occur with regard to the quantity and representative quality of NTC feedback in the take home packets and records of fire. To establish a baseline understanding of how the doctrinal DAG operates is no problem: an abundance of Soviet and U.S. doctrinal references is immediately accessible. In addition, the testimonies of available former Warsaw Pact officers lend an invaluable credibility to the validity of current doctrinal practices. There are limitations, however, in the availability of published NTC TAF standard-operating procedures and OPFOR records of fire and with regard to the incompleteness of some take-home packets.

According to at least one former fire support analyst, nothing exists in writing in the form of a standard operating procedure for the notional 52nd Infantry (Mechanized), that is, the TAF. Yet, some research in this area is essential to determine the scope of duties and responsibilities for the TAF in the context of performing key "higher headquarters" functions in managing the division's deep attacks and counterfire. The only written source on TAF operations is in the form of a memorandum to the Chief of Operations Group describing the respective roles of the DAG and 52nd Division Artillery at NTC. However, a number of former TAF analysts are readily accessible at the Command and General Staff College, and interviews have been feasible. Analysts' feedback provides insight not only into standard TAF functions but also into the nuances of TAF operations.

Another limitation is the paucity of OPFOR records of fire. Records of fire exist for only seven NTC rotations during the period from approximately October 1993 through May 1995. A key aspect of this thesis is the ability to show the relationship between the DAG firing in

close support of the OPFOR regiment and the resulting attrition of BLUFOR maneuver forces. The hard data that positively tie BLUEFOR losses to a specific DAG firing unit are contained in each battle's record of fire. The Battle Damage Assessment (BDA) tables listed for each battle record the "final" losses and reflect the senior Observer-Controller's subjective assessment, which may not necessarily reflect the actual number and effects of each weapon to vehicle vector. But, OPFOR records of fire do link the DAG system to the vehicle bumper number it destroys. Although seven battles' records of fire are not a data population equivalent, for example, to a RAND Corporation study which would sample an entire year's (12) rotations, the deliberate attack scenarios under scrutiny truly represent a random sample, in as much as they were the only records available at CTC-WIN, Fort Leavenworth. Meanwhile, the testimony of former TAF analysts indicates that the data contained in the available OPFOR records of fire and accompanying OC narratives provides an accurate representation of DAG attrition, volume of fire, and ammunition expenditure normally experienced during any standard MRB defense scenario.⁷ In addition, Q-37 acquisition records and OC narratives support findings in the records of fire. Although the Q-37/narrative cross-check technique may not yield the precise number of vectored bumper numbers, this technique is a reliable means of measuring the frequency of DAG fires in the OPFOR regiment's zone.⁸

A further limitation lies in the changing nature of the take home packets. The THP format changed in March and April 1995. The brigade level formats prior to March 1995 presented an in-depth discussion of each battle by Battle Operating System (BOS). The discussion included a chronology of the battle, with BOS strengths and weaknesses. Packets issued before January 1994 reflected well-developed cause and effect analysis. For example, the OC would indicate a

brigade's failure to screen its movement with smoke, then tie the accuracy and effectiveness of BM-21 strikes to unobstructed observation afforded the OPFOR observer. The new format is a one page summary of BOS observations for each battle. The analysis is limited at best to four or five lines of issue oriented discussion with an accompanying doctrinal reference. The most useful part of the new formats is the battle summary, which may or may not refer to cause and effect, but at least lists a chronology of significant artillery attacks. The altered format means that research and analysis are more difficult on rotations following March 1995 would at best be difficult.

A final limitation lies with the reliability of interviews with former OPFOR and BLUFOR soldiers. Statements and battle accounts collected in interviews may reflect professional loyalty and partiality to units and associates. The NTC's OPFOR is unquestionably one of the best-trained brigade-sized units in the U.S. Army. With nearly a fifteen consecutive-year winning record, the OPFOR guards its methods and reputation jealously. Similarly, BLUFOR personnel, having been on the proverbial "receiving end" of the OPFOR bayonet, may present an overly critical view of OPFOR methods. In both cases, pertinent information must be subjected to critical scrutiny and cross-checked with the objective narrative data from the take-home packets.

Prospects

Despite these limitations, sufficient material exists to conduct an in-depth study of the role which current DAG employment plays in influencing brigade level training at NTC. Sources for this study must necessarily come from both actual Soviet doctrine and U.S. interpretation and replication of that doctrine. An informed and comparative analysis of these sources in context provides the baseline for a comprehensive understanding of DAG employment at the NTC. NTC

take-home packets and interviews with former OPFOR personnel, former BLUFOR players, NTC fire support analysts, and officers of the Commonwealth of Independent States (CIS), the practitioners of the aforementioned doctrine, lend an invaluable perspective for assessing the legitimacy of the NTC DAG and its utility for training brigade combat teams. From assessment flows the possibility for proposing instructive alterations to present training practice.

Endnotes

¹U.S. Army National Training Center, Take Home Packets, Rotations 93-08, 93-10.

²Thomas D. Houston to William S. Wallace, "Role of the DAG and Division Artillery at NTC," TDS, 24 September 1999, Operations Group, National Training Center, Ft. Irwin, CA.

³U.S. Army. TRADOC Pamphlet 350-14, Heavy Opposing Force (OPFOR) Operational Art Handbook (Washington, DC: Deputy Chief of Staff for Intelligence, 1994), 9-9.

⁴John Erickson, William Schneider, and Lynn Hansen, Soviet Ground Forces (Boulder, CO: Westview Press, 1986), 228.

⁵David J. Lemelin, "Crisis in Battle: The Conduct of the Assault," Armor Vol. CIV No. 4 (July-August 1995): 9.

⁶Memo, Houston to Commander, Operations Group, 24 September 1994, Ft. Irwin, CA.

⁷Robert Lott, interview by author, 1 February 1996.

⁸Samuel White, interview by author, 5 December 1995.

CHAPTER 2

LITERATURE REVIEW: FROM DOCTRINE TO APPLICATION

Since the early 1980s, literature on Former Soviet and U.S. doctrine depicts a competition between the two superpowers which, to borrow from William Baxter, was akin to the race between the tortoise and the hare. While the Soviet war machine plodded at a focused, deliberate pace, sure of its methods and even more sure of outcomes, the U.S. frantically searched for the right combination of weapons and tactics to offset the quantitative superiority of the Soviet army.¹ In addition to U.S. fixation on former Soviet numerical, and quite evidently, qualitative superiority, other common themes surface. A variety of writings, including doctrine, articles on the subject of U.S. artillery employment, and even NTC after action reports, reveal recognition of Soviet artillery's masterful blend of centralization and flexibility. The same writings reflect a struggle in U.S. doctrine to achieve the right recipe for counterfire and close support and a disturbing awareness of the need for technological and doctrinal change at the operational and tactical levels.

The research sources for this thesis will come from four major groups: books on Soviet doctrine; U.S. Army doctrinal manuals; branch specific, i.e., artillery and armor articles in journals and periodicals; and the NTC take home packets. All the Soviet-oriented sources used were printed in the mid 1970s through the late-1980s, before the fall of Soviet communism and the ensuing reduction and downsizing of the Warsaw Pact armies. The NTC's Krasnovian DAG represents a motorized rifle division's assets of this period and

employs the lessons of combined arms warfare developed by the Soviets during the fifty years before the end of the Cold War.

Until the publication of the TRADOC (Training and Doctrine Command) Pamphlets 350-14 and 350-16, Heavy Opposing Forces (OPFOR) Operational Handbook and Heavy Opposing Forces (OPFOR) Tactical Handbook, the most comprehensive resource on Soviet operations and capabilities was the FM 100-2-1, The Soviet Army, Operations and Tactics. Last published in 1990, it remains a highly credible reference on unit organization, weapons systems characteristics, and operations from front level to motorized rifle platoon. NTC Operations Group scenario planners continue to use the FM 100-2-1 in conjunction with the Jane's reference series and Jane's Defense Weekly. As late as December 1995, the NTC Threat Manager used the FM 100-2-1 as a reference for Krasnovian artillery capabilities.² The key difference between the FM 100-2-1 and the TRADOC series is that the FM documents the organization of the Soviet army while the TRADOC Pamphlets outline the capabilities and organization of an opposing force.

At the end of the Cold War and following the dissolution of the USSR, TRADOC recognized that the U.S. Army required a flexible training threat model that could represent the threat capabilities of any one of a number of potential adversaries. Consequently, the TRADOC Pamphlets provide a "building block" approach to tailor threat capabilities to a desired training model package.³ The TRADOC 350 series is now the basis for the forces and doctrine used by all OPFOR units at the CTCs.⁴ The NTC adopted the TRADOC 350 series in the fall of 1994.

The most significant feature of the TRADOC series, as noted by the 11th ACR, the NTC's OPFOR, was the enhanced flexibility granted to OPFOR commanders. The 11th ACR squadron commanders, who role-play motorized rifle regiment commanders during the rotations, understood flexibility to mean that they could exercise a greater margin of "free play" in the employment of their assets and tactical formations. No

longer were commanders restricted to the rigid, lock-step employment criteria for their assets and tactical formations prescribed in the FM 100-2-1.

The TRADOC series associates OPFOR artillery flexibility with its organization for combat, usually expressed in the formation of artillery groupings, i.e., RAGs and DAGs. According to TRADOC Pamphlet 350-14, the practice of forming temporary artillery groups facilitates flexibility for attainment of mass and concentration of fires, while providing the best organization required for centralized control.⁵ In addition, both operational and tactical handbooks discuss in general terms the conditions and criteria under which the RAGs and DAG will fire. The operational manual says the DAG has a "general support" mission, a U.S. doctrinal artillery mission undoubtedly borrowed to convey the understanding for a U.S. audience that the DAG provides support to the force or division as a whole.⁶ Although the operational manual says the DAG will support the regiment showing the "best progress," no explanation is provided on the extent to which the DAG will support a secondary effort regiment that is demonstrating the same or even less success than the main effort regiment. The TRADOC series pamphlets do emphasize flexibility, but the concept is not new to Former Soviet artillery.

Any examination of Soviet artillery simply cannot ignore history. The basic technical and tactical formulas for achieving fire superiority have changed little since World War II. Historical research shows indisputably that the OPFOR artillery employment principles of density norms and force correlations as depicted in the TRADOC series are rooted in Soviet breakthrough tactics developed on the Eastern Front in World War II. For example, Historical Scenarios of Soviet Breakthrough Efforts in World War II, which examines the Pogoreloye Gorodishche offensive in 1942 and of the Lvov breakthrough two years later, show how the Soviets prioritized allocation of artillery for the

main effort strike force.⁷ The Twentieth Army's main-effort-to-supporting-effort tube allocation ratio of 65 percent to 35 percent is comparable to the NTC standard model of 75 percent to 25 percent. This scenario book, produced by the Historical Evaluation and Research Organization, is an invaluable source for depicting the employment of artillery in the developmental stages of breakthrough tactics. In addition, Martin Caidin's account of the Battle of Kursk, The Tigers Are Burning, refers to examples of Soviet counter-preparation fires which bear a striking similarity to phased fires in the defense as outlined in the TRADOC series handbooks. The historical references serve to reinforce conclusions drawn about the validity of current doctrine.

The 1984 edition of Taktika (Tactics) and Baxter's Soviet Airland Battle Tactics are excellent treatments of Soviet tactical principles but lack specificity on artillery group employment. Taktika discusses artillery tasks in general terms but does not associate specific missions with artillery groups. In fact, Taktika does not mention the practice of artillery grouping. Baxter's work is as much a study of the Soviet military mind as it is a lucid, examination in layman's terms of Soviet combined arms tactics. He artfully shows how the Soviets apply the concept, algorithm, and decision process to solving any military problem, including the employment of artillery.⁸ Less technical than other sources, including Bellamy's treatment of norm determination in Red God of War, Baxter's one or two examples nevertheless accomplish his intent of conveying the significance of scientific method to planning and execution. In addition, he provides a very brief though thought-provoking discussion of Soviet proactive counterfire, which he calls a Soviet battalion's independent hunt for artillery.⁹ According to Baxter, the counterfire mission is a semi-independent mission assigned to an artillery battalion that is not part of the RAG or DAG.¹⁰ This idea differs greatly from the majority

of other sources on Soviet counterfire, which usually associate the counterfire mission with the RAG and DAG.

Whereas Taktika discusses artillery employment with reference to general tasks that the artillery must accomplish, The Voroshilov Lectures analyze artillery employment in significantly more specific and useful terms. Published between 1989 and 1992, the Lectures are materials presented in the mid-1970s at the Voroshilov General Staff College. They comprise a study of the Soviet approach to operational and tactical warfighting for the time. The Lectures, says J. A. Baldwin, not only stand as a legacy to the bygone Cold War era, but more significantly serve as sources of planning and executing combined arms operations.¹¹ The chapter on front offensive operations ties specific missions to artillery groupings ranging from the Army Group of Rocket Artillery (AGRA) down to the RAG. In addition, this chapter presents the operational norms for artillery density per kilometer and the average number of artillery pieces required to destroy typical type targets. The Lectures form a record, a clear, concise cookbook approach to front and division-level Soviet artillery doctrine as it entered the 1980s.

Another useful source is Chris Bellamy's Red God of War. This was an exceedingly popular book, particularly among U.S. field artillerymen during the late 1980s, because of its study of the Soviet reemphasis on non-nuclear artillery in the European theater of war.¹² Bellamy's message is compact yet powerful. His dramatic yet somber accounts of Soviet Eastern Front breakthrough efforts, which involved incomprehensible numbers of artillery massed in three-to-six-kilometer-wide strike sectors, triggered concern over NATO's paucity in artillery. The book also sensitized the artillery community for the need to reexamine U.S. counterfire doctrine.

Besides relating a fascinating history of a proud Soviet combat arm, Bellamy's book provides a detailed analysis of artillery employment

at regiment level. Whereas other works on Soviet doctrine provide general treatments of norm determination, Bellamy shows the actual formulas and demonstrates the process, for example, according to which a regimental commander would determine the number of 122mm rounds required to destroy a hastily prepared U.S. platoon defense. These details provide both a model and an application to compare with current NTC assessment tables and average ammunition expenditure and resupply rates in the RAG. In addition, Bellamy diagrams how specific RAG battalions are matched to number-designated targets in a motorized rifle regiment's (MRR) fire plan, while he appropriately emphasizes the prodigious use of reconnaissance to exploit success and attack lucrative targets of opportunity. This emphasis mirrors NTC. Next to the TRADOC 350 series, Red God of War is perhaps the best reference for regimental artillery tactics.

A look at U.S. doctrine over the last decade shows a doctrine that conceptually delineates the responsibilities for deep operations and counterfire among the corps, division and brigade. While the FM 71-100, Division Operations, and FM 100-15, Corps Operations, identify the purpose of deep operations, the FM series on fire support speaks to the coordination and target attack responsibilities at each level.

The 1989 edition of FM 6-20-30, Fire Support for Corps and Division Operations, and the 1993 edition of FM 6-20-2, Corps Artillery, Division Artillery and Field Artillery Brigade Headquarters, acknowledge division and corps responsibilities to plan and conduct the counterfire and counterbattery fight in the corps and division area of operations. Both manuals also discuss the proactive counterfire fight, the aggressive detection and attack of enemy sensor and attack systems and the reactive counterfire, or counterbattery, fires delivered in response to an enemy mortar or artillery attack.¹³ These respective responsibilities are a function of the availability of sensor assets to acquire enemy fire support and attack systems capable of ranging and

destroying enemy targets. Since the corps has the preponderance of both, its role is proactive, while the division, with less, must take on a more reactive counterfire effort. Another justification for this reactive role, says the FM 6-20-30, is that the majority of the Threat's active fire support assets operate in the division area responsibilities.¹⁴ A "more reactive role," must be intended as a relative term here. Even the FM 71-100, Division Operations, stresses the criticality of inflicting attrition on the enemy's long range artillery (DAG) early in the fight.¹⁵ Every 52nd Infantry Division (Mechanized) order to player brigades specifies in its commander's intent and Annex D (Fire Support) the priority of attrition of the DAG. Interestingly, neither FM addresses the consequences of allowing a full strength RAG or DAG to begin the battle. The FM 6-20-40, Fire Support for the Brigade (Heavy), mentions the word counterfire only once, then only as an example of a field artillery support plan. According to U.S. doctrine, then, the counterfire and counterbattery fights belong at the division and corps levels.

Insofar as counterfire is concerned, the 1989 edition of the FM 6-20-30, Fire Support for Corps and Division Operations, is the only fire support doctrinal manual which discusses the composition and mission of Former Soviet artillery groups. According to the manual, the RAG and the DAG are focused primarily "in support of close operations against friendly maneuver elements . . . not friendly artillery."¹⁶ By implication, counterfire for the DAG, is a secondary mission, since the DAG will engage friendly fire support assets "as required."¹⁷ Here, the primary executor of the Soviet counterfire fight is the RAG, with the DAG and the RAG supporting the battle as necessary. Clearly, there is less emphasis on the DAG's role in counterfire here than in The Voroshilov Lectures and in Bellamy's Red God of War, the latter which identifies the DAG weapon systems' priority as suppression of MLRS.¹⁸ If this is the case then, the DAG and RAG missions are analogous to the

missions of the U.S. direct support and reinforcing artillery, while the RAG's mission of counterfire becomes analogous to the MLRS (Multiple Launch Rocket System). Range and acquisition capabilities comparisons show an even more pronounced mismatch than already exists. The FM 6-20-30 lacks an explanation of each artillery grouping's responsibilities during phased fires. Such an explanation would be helpful in identifying specific missions and likely systems that would engage friendly targets. Suffice it to say, the level of detail is appropriate for the purpose and the audience.

Articles appearing in professional military journals over the last decade show an awareness of the quantitative and qualitative disparity of former Soviet and U.S. artillery and a corresponding need to modify U.S. doctrine to fight at this disadvantage. It is instructive to compare articles written before and after the 1991 Gulf War. Articles written before the war note this time worn quantitative disparity and the incessant U.S. struggle with breaking the code on counterfire. For the most part, Iraqi capabilities rather than performance justified the fears articulated in prewar articles. For example, a recurring emphasis was the fact that at least four Iraqi artillery systems could outrange even the MLRS.¹⁹ Post-war articles confirm these fears and buttress the argument both for more and better systems and for a need to focus the counterfire fight at a higher level than brigade.

Major Alan B. Moon's prewar article, "Silencing The Red God of War," in the Field Artillery Journal (1989), says that the current U.S. artillery force structure is incapable of providing an adequate counterfire fight while fulfilling its primary purpose of providing close support to the maneuver brigade.²⁰ The structure in 1989 is the same one in use today. Citing Bellamy's Red God of War, Moon uses the number of tubes available in any given Soviet operation to show that a direct support artillery battalion with one Q-36 counter mortar radar

simply cannot manage the colossal counterfire requirements presented by a RAG and DAG while supporting a two-to-three task force brigade combat team. He recommends placing the burden of counterfire on division artillery, an organization, he says, which has the sensor and attack assets equal to counterfire requirements.

In a Field Artillery Journal post-Gulf War article, "Silver Bullets," Colonel Vollney B. Corn and Captain Richard A. Lacquement document the inability of artillery systems to meet doctrinal requirements. The M109A3 self-propelled howitzer, the current workhorse of the U.S. field artillery, was outranged by both Iraqi conventional and extended range munitions.²¹ Even the MLRS, the U.S. primary counterfire weapon, was outranged by a total of four Iraqi cannon systems. The article speaks clearly to the inadequacies of our current top of the line artillery weapons systems.

Articles in maneuver journals also stress the need for change. Though undoubtedly unintentional, Major David J. Lemelin levels a weighty indictment at U.S. field artillery in "Crisis in Battle, The Conduct of the Assault" (Armor, July-August 1995). He says that the best value of artillery is its ability to "suppress," so maneuver forces can close to within direct fire range.²² Any article in the Field Artillery Journal on the topic of assault would, in contrast, usually stress the destructive capability of artillery. Yet, the maneuver community's relegation of artillery to a suppressive role is a direct result of artillery's poor record of performance in supporting maneuver, a problem stemming from the requirement for the direct support battalion to execute both close support and counterfire missions.

NTC take home packets are useful for providing the objective and "raw" feedback data to explore how well brigades manage the artillery close support and counterfire fights. Take home packets provide both the OC's narrative feedback and the actual numerical losses of combat power due to direct and indirect fire. The most telling data

are the BLUFOR and OPFOR records of fire maintained by TAF fire support analysts. The BLUFOR records of fire track mission events by time of opening fire, units of fire, volume, the observer initiating the mission and the effects on the intended target. These records provide an index for the artillery unit's effectiveness in providing close support and counterfire to its supported brigade. OPFOR records of fire, formatted much the same way, are the most accurate means for measuring the DAG's effect on the training of the BLUFOR brigades. Not only do they indicate the firing unit, volume of fire and type of munition, they include as well precisely which BLUFOR vehicles, by bumper identification number, were assessed or killed in each OPFOR artillery attack. The OPFOR records of fire provide a window for evaluating the application of former Soviet doctrine and more specifically, the measure of DAG attrition of BLUFOR maneuver forces. Other data include the narratives and synopses of battles.

The two types of narrative observations in the take home packets are the Battle Operating System (BOS) strengths and weaknesses and the battle and rotation executive summaries. Each level, from brigade to company, has its own set of BOS comment sheets. The "BOS comments," as the observer-controllers call them, are brief three or four line comments on issues, positive or otherwise, which occurred during the course of a battle that merit teaching or learning emphasis. For example, a brigade fire support observer controller may note during the preparation phase of a battle that the brigade fire support officer did not record the brigade obstacle plan on his overlay. The failure to do so may affect success in direct and indirect fire integration, a point which the observer controller could use to show cause and effect in his after action report or battle summary. The battle summaries are compiled at task force and brigade level and provide a chronological overview of the course of a battle. The idea is that the rotational

unit can link issues raised to what happened or failed to happen on the battlefield.

Other sources include personal experiences and the testimony of former OPFOR and BLUFOR soldiers and NTC TAF analysts. The author's own three year billet at the NTC as an artillery and fire support Observer-Controller for light infantry, mechanized infantry and armor task forces lends a unique perspective on DAG employment. The author's close proximity to the commander and/or his fire support officer in every NTC battle afforded direct observation of the effects OPFOR artillery. The experience of observing the causes and effects of artillery losses serves to substantiate or refute the evidence recorded in take home packets, OPFOR records of fire, and interviews with former OPFOR and BLUFOR soldiers.

Literature for this study reveals the centralized yet flexible structure of Soviet artillery and the U.S. efforts to achieve effective countermeasures against the OPFOR's numerical and qualitative artillery advantage. While U.S. doctrine and, indeed, some Former Soviet doctrinal writings associate specific missions with artillery groupings, the more recent trend reflected in the TRADOC Pamphlets, NTC Take Home Packets, OPFOR records of fire, and interviews with former Warsaw Pact officers, emphasizes the OPFOR commander's authority to shift his firepower within his zone of responsibility to wherever he can reinforce success. The OPFOR doctrine contained in the TRADOC Pamphlet 350 series, which is, more accurately, the U.S. interpretation of an OPFOR doctrine, shows a departure from the customary misconception of a doctrinally choreographed enemy toward a realization that an OPFOR commander's decision cycle is as much influenced by the factors of mission, enemy, terrain, troops and time (METT-T) as that of a U.S. forces commander. In addition, U.S. doctrinal sources demonstrate a full appreciation for the artillery based OPFOR Army. U.S. field manuals on corps and division level fire support show that the most

effective artillery countermeasure is the deep operation aimed at striking the enemy's artillery first. While the manuals assert that deep operations typically may employ a variety of attack assets, one of which is nearly always artillery, U.S. military journals published in the wake of Desert Storm question the capabilities of the aging U.S. howitzer inventory, citing the fact that at least four Iraqi artillery systems could outrange even the best U.S. indirect fire system.

All sources for this thesis provide a broad foundation for the study of DAG employment at the National Training Center. These materials reflect a sophisticated U.S. understanding of Soviet artillery during the heyday of the Soviet threat. Materials more narrowly focused on the NTC experience reflect just how trainers have adapted a vision of the threat to a particular place and set of circumstances. The issue remains of whether the U.S. Army is drawing maximum benefit from the way that Soviet artillery is depicted and employed at the NTC.

Endnotes

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¹⁸Bellamy, 198.

¹⁹Vollney B. Corn and Richard A. Lacquemont, "Silver Bullets," Field Artillery Journal, HQDA PB6-91-6, (October 1991): 11.

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CHAPTER 3

METHODOLOGY: HOW TO APPROACH THE PROBLEM

The intent of this thesis is to show that how the DAG is currently employed and how the 52nd ID (M)'s methods for countering it undermine the NTC purpose of training brigade combat teams in the conduct of U.S. Army doctrine. The study demonstrates that conditions created by DAG fires and the notional 52nd ID (M)'s actions, i.e., attrition of BLUFOR maneuver forces, excessive tasks relegated to the brigade, etc., prevent the brigades from accomplishing their training missions. The study seeks to determine whether the DAG is a viable training tool for brigade combat teams and if the NTC should retain it as a part of the OPFOR artillery threat package. In addition, the study draws attention to the need for possible modifications in the way our current doctrine addresses responsibilities and capabilities for conducting counterbattery and counterfire at the brigade and division levels. This thesis concludes with recommendations for OPFOR and BLUFOR artillery models at the NTC which are more consistent with doctrine and which optimize the training of brigade combat teams.

The methodology for this study rests on a three step analytical process which utilizes former Soviet and U.S. doctrine and NTC historical records as a data base. The first step is to establish how closely NTC DAG employment mirrors validated threat doctrine. The study compares how the OPFOR employs the DAG in a defensive scenario (BLUFOR deliberate attack) with actual former Soviet and OPFOR practice. The second step is to determine whether the brigade's higher headquarters, the NTC's fire support training analysis facility (TAF), executes its doctrinal responsibility by inflicting losses on the DAG, thereby

increasing the probability for a rotational brigade's success. This step matches the NTC's notional division's counterfire procedures with U.S. division deep battle doctrine. The third step is to show what tasks or expectations the NTC DAG model and the 52nd ID (M)'s actions in step 1 and step 2 have imposed upon the brigade and to determine if the brigade is capable of performing these tasks. After having established the DAG's capabilities, the extent of the 52nd ID (M)'s role in setting the conditions for the brigade and the brigade's ability to counter and mitigate DAG fires, the study measures the effect of DAG fires on the brigade combat teams in terms of combat power attrition and the brigade's ability to achieve its training objectives after sustaining losses.

The analysis in step one begins with a comparison of the NTC DAG with validated OPFOR artillery doctrine to determine the degree of doctrinal conformity. Initial points of comparison include tube strength allocation and DAG employment options. The analysis applies the actual Soviet six-step methodology for allocating artillery from front to regiment to determine if the NTC's two battalion DAG is an accurate representation of the assets passed to the supporting effort division.¹ Despite the precision with which the Soviets calculated the number of tubes for a particular mission, numerous works note that it is practically impossible to predict the exact tube strength the OPFOR would use because allocation is strictly mission dependent.

Step one next examines how the NTC's OPFOR employs the DAG. The analysis compares doctrinal positioning and movement of RAG and DAG battalion with the positioning and movement of these groupings on the NTC battlefield. Since all OPFOR artillery assets are notional, this method involves a comparison of NTC planning graphics and how the icons are moved in the TAF's SUN computer. The study examines group positioning depicted on actual 1:250,000 scale planning graphics with doctrinal positioning standards described in both Soviet and current

U.S. Army Field Manuals (FMs). Second, we look at how accurately the NTC replicates the movement of artillery groupings in each of the standard force-on-force scenarios by comparing Soviet artillery doctrinal rates of movement with rates of movement outlined in the NTC Rules of Engagement. Then we evaluate how well the "30-60" and "60-90" minute rules replicate RAG and DAG rates of march and times of opening fire.

Step one concludes with an in-depth comparison of DAG doctrinal employment with the realities of NTC. First, drawing from Soviet and U.S. doctrinal literature, the research establishes the role of the DAG and defines its mission focus for a secondary effort regiment as a close support weapon or counterfire asset. Using data extracted from OPFOR records of fire, the study compares the frequency of DAG fires in close support of the OPFOR regiment relative to its frequency of counterbattery mission against the Division Artillery (DIVARTY) Multiple Launch Rocket System (MLRS). The OPFOR records of fire identify the type of firing unit, the volume of fire, the target and its battle damage assessment or BDA. The record of fire is the most direct means of differentiating close support missions from counterbattery. For deliberate attack battles lacking OPFOR records of fire, close support missions can be identified by comparing the TAF's Q-37 radar acquisition log with observer controller comments regarding BLUFOR losses to artillery. Since the Firefinder radars are the only means of acquiring the notional OPFOR artillery, an artillery grouping can only be detected if it fires. Observer controller comments or entries in the take home packets indicating time and effects of artillery or rocket are cross-checked with the Q-037 acquisition log. For example, an observer controller in Rotation 94-06 stated in his battle summary, "At 0745 hrs, TF 1-12 AR was hit with approximately 240 rockets . . ."² If the acquisition log indicates an acquisition at 0745, then in all likelihood, the DAG fired the close support mission. As a verification

measure the Q-36 log is checked to determine if it acquired a firing unit at 0745. Since the Q-36 can only acquire the 120mm mortars and RAG assets, if it did not have an acquisition at 0745, then the DAG positively fired the mission. The frequency of these acquisitions and those indicated in the OPFOR records of fire are reliable means of measuring the DAG's degree of participation in the close support battle.

Next, the number of grid calls for fire missions will be compared with the number of missions that the DAG fires as part of the OPFOR's fire plan. This comparison measures the degree to which the OPFOR adheres to its own stated principle that "DAG assets provide the best fire support when employed during an established fire plan."³ Since the fire plan is one of the products of a staffing process designed to identify key or high payoff targets critical to the division's success, attack of targets of opportunity following a grid call for fire may be an indicator of an ineffective targeting process and/or a highly responsive fire support system. In addition, only the Motorized Rifle Division (MRD) (OPFOR) commander can authorize the DAG to fire after the completion of the fire plan.⁴ The three battalion RAG and the 120mm mortars are the systems intended for the immediately responsive fire support for the regiment. A DAG in general support would be less inclined to provide immediately responsive fires to a grid mission in a secondary effort regiment's zone and more apt to adhere to the attack of MRD main targets in the main effort regiment's zone. DAG responsiveness to a comparatively high number of grid calls for fire in secondary effort regiment's zone would not be consistent with Soviet doctrine.

Finally, we examine how much of the DAG's total high explosive (HE) ammunition allocation is expended during typical motorized rifle battalion (MRB) defense scenarios (BLUFOR deliberate attacks). NTC, and indeed the Battle Command Training Program's (BCTP) World Class OPFOR, strive to realistically depict the firepower that is doctrinally

concentrated in a main effort strike sector. The NTC practice is that 75 percent of the DAG's effects should be focused in the main effort regiment's strike sector and the remaining 25 percent of its effects divided between counterfire and close support to the secondary effort regiment's sector. A trend showing expenditures in the OPFOR regiment's zone significantly higher than 25 percent, then, would indicate DAG utilization outside these doctrinally based parameters.⁵ OPFOR records of fires, again, serve as the primary data source.

Step two examines the methods by which the NTC influences or sets the conditions for the brigade's close fight. This examination necessarily entails a look at the roles of the Operations Group Plans Team and the NTC fire support TAF in the planning and execution of division deep operations which include, but are not limited to, operations designed to influence the OPFOR's long range artillery. Discussion extends to the purpose of the division deep battle, the division's responsibilities for it and if the 52nd ID (M) fulfills those critical condition setting responsibilities. Analysis determines whether the TAF is engineered to accomplish the tasks imposed on it. Step two answers the question, "Does the NTC set the condition for the brigade's success in the close battle?"

Step three draws from the discussion and analysis in steps one and two to identify those tasks and conditions which are now relegated to the brigade combat team. Here the tasks that now must be executed are juxtaposed with the brigade's doctrinal and organizational capabilities. Since the division has the doctrinal responsibility for counterfire, we compare the manpower and expertise pool available with the division and brigade fire support elements to determine if the brigade has the capacity for managing the close support battle and the reactive counterfire fight. Second, we examine the acquisition capabilities of the brigade's Q-36 radar and the range capabilities of the two M109A3 155mm self propelled howitzer battalions to attack RAG

and DAG assets. This step answers the question, "If the division fails to influence the DAG during deep operations, does the brigade have the capabilities to acquire and attack the DAG, thus creating an essential pre-condition for maneuver success?" Finally, this step measures the influence of DAG fires on the brigade's ability to close on the OPFOR objective and conduct the most difficult yet least practiced tasks which are the index of a maneuver unit's combat readiness. In the aggregate, this step answers the question, "Does DAG attrition prevent the brigade from achieving their training objectives?"

Answers to these and the foregoing questions clearly address the issue of whether current DAG employment at the NTC severely constrains the rotational unit's ability to train doctrinally to a standard that constitutes combat readiness. On the basis of a step-by-step analysis, the thesis arrives at verifiable conclusions which show that DAG employment at NTC requires modifications to optimize training opportunities. Appropriate recommendations are made to remedy apparent discrepancies, shortcomings and anomalies.

Endnotes

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CHAPTER 4

BLUFOR ON THE RECEIVING END:

PROCEDURES AND OUTCOMES

Histories of Soviet artillery evoke images of World War II field pieces firing hub to hub, delivering a hail of metal on man and machine. In his book, Red God of War, Chris Bellamy describes the harrowing experience of being under artillery fire: the sight of men blown apart, disemboweled, and . . . tossed about as gory playthings."¹ While improvements over time in survey and directional control and the virtual disappearance of towed pieces among Russian forces have altered employment tactics, the effects of this awesome firepower have little changed. Needless to say, it is difficult to replicate these artillery effects in a training environment. The NTC uses the vehicle mounted Combined Arms Training Integrated Equipment System (CATIES) to signal crews when they are receiving incoming artillery. Although the shrill four second alarm and deafening pyrotechnic blasts cannot duplicate artillery's destructive potential, the experience of watching the simultaneous detonation of 20 vehicles' CATIES in repeated rocket strikes imparts a sense of total helplessness and human fragility. No army, according to Bellamy, understands the use of artillery better than the Russian. To counter this potential, we must understand it. It is essential, then, that our Combat Training Centers (CTCs) represent this potential precisely.

Doctrinal fidelity and realism are the key components of the NTC's training mission. The NTC employs observer controllers to provide feedback in the "doctrinal conduct" of unit missions while the system collectively provides "the most realistic training environment short of

war."² The validity of the DAG or any combat simulation system is gauged by its fidelity to doctrine and its utility to the NTC's purpose. To be valid, then, a weapons system, whether actual (physical and visual) or notional (existing as a computer icon), must faithfully represent the system's purpose, appearance, numbers, geographic positioning on the battlefield, movement, vulnerabilities and effects capabilities. At the same time the systems must demonstrate the capacity to give and take punishment to reinforce training emphasis. Moreover, it is important to accurately depict the BLUFOR systems which are designed to counter and/or react to each OPFOR system. Measurements of validity must establish how closely the NTC DAG model mirrors Soviet doctrine in terms of strength or tube allocation, positioning on the battlefield and utilization in support of the OPFOR regiment.

Allocation of Assets

The sequence for determining artillery allocation is a painfully methodical process which reflects the Russian belief that significant aspects of warfighting can be reduced to sets of laws, norms, and mathematical calculations. Many of the principles regarding density norms and the correlation of artillery forces were advanced during the 1924 All-Union Artillery Conference and further developed in the Frunze military reforms of 1924-25.³ Nearly lost to posterity in the 1937 purges, the principles were revalidated in combat; some persist today. The Russian thought process relies heavily on an understanding that aggregates in warfare are governed by laws. Combat experience can be subjected to scientific analysis to provide a verifiable data base for further planning.⁴ Mathematical norms derived from historical experience provide planners with predictable outcomes and determine the allocation of forces to increase chances of success.⁵ This experience-and-data-driven process, for example, enables a commander to apply a standard mathematical equation to determine either the number of anti-tank weapons required at the point of penetration or the number of 122mm

howitzer high explosive rounds required to destroy a hastily prepared U.S. defense. Military success follows from the correct application of empirically-derived norms, while deviation from them results in tactical or operational failure. In the 1977 edition of Savkins's Basic Principles of Operational Art and Tactics, Rule Number 5 states plainly that winning or losing depends upon the relative numbers of the warring sides.⁶ This rule of thumb applies to all aspects of warfighting and remains an integral part of the process for determining tube allocation in the formation of artillery groups.

Although Russian doctrine uses standard norms to determine tube allocation from front to regiment, the NTC never applies the correlation of forces and means method in determining relative tube strength for BLUFOR and OPFOR artillery. Since the BLUFOR always brings with it a direct support 155mm self-propelled howitzer battalion, and since NTC augments it with a notional 155mm self-propelled reinforcing battalion, determination of the opposing force artillery has simply been a matter of matching similar opposing artillery forces that fit within doctrinal guidelines and are tactically competitive.

The Operations Group scenario team makes the initial determination of OPFOR tube allocation. Once a rotation's campaign plan is designed and approved by the Chief of Operations, the NTC Commanding General, and the rotational division commander, planners determine the number of battalions allocated to the RAGs and DAGs for each of the eight force on force battles. This determination is based solely on historical documentation, that is, what similar missions during past rotations employed.⁷ While still tentative, the mission tasks and combat strength allocations for both maneuver and artillery are published in draft combat battle instructions (CBI) and distributed to the 11th ACR so that staffs can begin their planning and wargaming.

Planners and fire support analysts then conduct what is called an "artillery laydown." The purpose of the laydown is to review what

Operations Group scenario writers have allocated to the OPFOR and to offer a forum for assessing the automation supportability of OPFOR and BLUFOR packages. During the laydown, the fire support analysts and planners first delineate the mission of the OPFOR artillery in a doctrinal context divorced from force correlations and density norms. Force correlations are never applied to BLUFOR and OPFOR artillery packages. The primary planning criteria are rotational historical data which support OPFOR's mission accomplishment while simultaneously providing an accurate signature in order to train the BLUFOR brigade. The planners consider a myriad factors which could potentially affect the course of a particular training event, such as the terrain over which the battle will be fought (which may require manual adjustments in speed during artillery movements between firing positions, relative range capabilities and positioning). For example, if the planners allocate one 2S1 and one 2S3 battalion to a RAG for a movement to contact mission in the NTC's southern corridor, the analysts may recommend an additional 2S3 battalion because the 2S3 battalion in a previous rotation conducting a similar mission was too quickly attrited and deprived the BLUFOR of a realistic and competitive training experience. In addition, the planners would limit the DAG allocation to two battalions, but restrict the DAG's use to the emplacement of special munitions only. The goal of the laydown is to ensure that NTC planners facilitate a realistic and valuable training experience within doctrinal guidelines. The subjective laydown method incorporates NTC nuances that are difficult to capture authentically in force ratio calculations.

The use of force ratios is more appropriately suited to maneuver than artillery in NTC scenario planning. The addition or removal of one or two T-80 main battle tanks or BMPs from the CBI is an essential aspect of establishing the right conditions for a training event. If the desired outcome is for the BLUFOR to destroy a prepared motorized rifle battalion defense (a reinforced company), the ideal

ratio is three-to-one, a calculation which requires a smaller number of OPFOR tanks and BMPs than a mission requiring the BLUFOR to merely penetrate.⁸ Since the BLUFOR artillery is always the same, i.e., two battalions in the brigade and the notional MLRS battery and battalion, the number of battalions in the RAG and DAG should deviate little, if any, from rotation to rotation.

While the NTC does not use force ratios to determine OPFOR artillery allocation, NTC personnel have worked to develop a methodology for deriving RAG and DAG configurations tailored to NTC and consistent with Russian doctrine. An April 1990 RAND study said the OPFOR "is credited with a doctrinally correct number of artillery units," but there is no indication of how this conclusion was reached.⁹ In March 1995, NTC fire support analysts developed an artillery allocation model for the Krasnovian Central Front based on the historical Soviet practice of allocating approximately 75 percent of the front's assets to the main effort division's axis, while the remaining 25 percent went to the supporting effort division.¹⁰ A look at any Soviet breakthrough operation on the Eastern front during World War II shows a nearly identical pattern of allocation. For example, in the Pogorolye Gorodische breakthrough in August 1942, the Twentieth Army placed fully 72 percent of its howitzers and rockets in the main effort divisions.¹¹ This distribution reflects a RAG and DAG battalion allocation nearly equivalent to the current NTC configuration. The solution here suggests a approximate 75/25 percent split between the main and supporting efforts irrespective of the force on force mission type. Although the result closely approximates an actual supporting effort DAG configuration, the same allocation ignores such critical factors as strike sector widths, density norms and the impact of other fire support assets on the determination of DAG tube and rocket allocation.

In June 1995, NTC Threat Management published and briefed the "OPFOR Artillery Support Laydown," which described front to regiment

artillery allocation and recommended a RAG and DAG configuration tailored to each force on force mission type.¹² According to this laydown, NTC Threat Management used the TRADOC 350-16 as a basis for calculating the distribution of artillery.¹³ The manual, however, only shows a diagram illustrating how a higher command may allocate artillery for a front's main attack and does not articulate the methodology applied to derive the precise composition of artillery groupings for specific missions in a secondary effort regiment's zone or sector. NTC Threat Management used Russian doctrine and applied a six step methodology for front artillery distribution to demonstrate the doctrinal correctness of current NTC RAG and DAG configurations.

The purpose of the laydown was to determine the amount of artillery to support a secondary effort OPFOR regiment in each of the force on force missions of the NTC. The general methodology as stated in the laydown was a four step process.

1. Use validated data (TRADOC Pamphlet 350 series) to array the Krasnovian Central Front for an operational offensive.
2. Allocate artillery to meet the operational aim.
3. Determine allocation of artillery to army and divisional artillery groups.
4. Determine the amount of artillery available to support a first echelon regiment in a secondary effort zone or sector.¹⁴

Interestingly, the sequence within the laydown parallels the procedure outlined in an article describing the process of artillery allocation for front offensive operations in The Voroshilov Lectures. NTC Threat Management cleverly applied the NTC's own Krasnovian Central Front 29th Combined Arms Army (CAA)'s Order of Battle to illustrate the procedure.

The six step process reflects necessary tailoring to fit the NTC scenario. For example, the role of front aviation in the calculation process is assumed away simply because the NTC does not replicate it. In addition, since the widths of NTC's southern and

central corridors remain the same, the calculation process here applies sector widths that may not fit doctrinal widths precisely.

The first step looks at what must be targeted during the preparatory phase. Step 1. The first step in determining the army's artillery requirements is to calculate the number of targets in a forward defensive or penetration area that must be engaged simultaneously during the preparation phase. NTC Threat Management similarly labels the first step in determining the number of missions required for the preparatory phase, that is "determining targetable hectares [10,000 square meters or 2.47 acres]."

Step 2. Deduct the number of targets to be attacked by air force assets from the total. For the sake of simplicity, the laydown does not use front aviation in the calculation since it is not replicated at NTC.

Step 3. Use established norms to determine the number of artillery battalions required to destroy remaining targets. NTC Threat Management uses division breakthrough sector norms listed in the TRADOC 350-14 to determine the number of weapons required per kilometer to achieve neutralization, i.e., 25 to 30 percent destruction. The numbers shown here in tubes per kilometer average five to ten tubes less than sector densities listed in an article printed in the mid-1970s that was featured in The Voroshilov Lectures.¹⁵

<u>Sector Width</u>	<u>Dutch/Belgian</u>	<u>U.S</u>	<u>German</u>	<u>U.K.</u>
4 kilometers	130	120	115	110
6 kilometers	120	115	110	105
12 kilometers	110	110	100	95

In developing this procedure, NTC Threats assumed that a main strike sector totals 8 kilometers, while the supporting effort (NTC model) is 4 kilometers.¹⁶ Doctrinally, main effort strike sectors are smaller than supporting effort sectors to facilitate the concentration of tubes per

kilometer. The discrepancy here reflects the planners' problem of fitting NTC terrain to doctrinal widths.

32 CAA (Combined Arms Army) (main effort)

8 km (strike sector) x 105 weapons/km = 840 weapons required

29 CAA (supporting effort)

4 km (strike sector) x 120 weapons/km = 480 weapons required

Front's artillery requirements = 1320 weapons

Step 4. To determine additional requirements, deduct organic front weapons available from the total amount required. NTC used the Krasnovian Order of Battle to determine a total of 486 weapons in each CAA [972 for the front]. This is deducted from the front's total required weapons to determine the number of tubes needed to meet the main effort strike sector requirement.

Total required - available = front reinforcement necessary

Front: 1320 - 972 = 348¹⁷

Step 5. The sum of the first echelon armies' requirements constitutes the front's artillery requirement. With a deficit of 354 tubes, NTC assumes that the Krasnovian supreme headquarters would grant the reinforcement necessary to achieve main effort strike sector requirements. Normally, air assets, if available, would be planned to compensate for the shortfall.

The laydown then assumes that the front commander would allocate two-thirds of his artillery assets to the 32nd CAA, his main effort, while the remaining one-third would be allocated to his supporting effort, the 29th CAA (the NTC's Krasnovian CAA) and the 9th CAA, a supporting defensive sector. From here, the NTC laydown says

that the 29th CAA would form its artillery groupings by allocating 50 percent of its assets to the main effort division, the 28th Motorized Rifle Division, for example, while dividing the remaining battalions between the two supporting efforts, the 12th MRD and the 51st MRD. The 12th MRD, as it contributes to the 28th MRD's strike sector, forms a four to five battalion DAG, while the 51st MRD, which does not contribute to the strike sector, is left with a two battalion DAG, consisting of one 18 tube 152mm 2S5 battalion and one 18 launcher 122mm BM-21 battalion.¹⁸ This two battalion DAG supports two motorized rifle regiments (MRRs) and represents the current NTC DAG configuration employed in nearly every campaign scenario. The typical size of a RAG varies from two to four battalions.¹⁹ The RAGs formulated in the laydown each contain two to three tube artillery battalions, one 18 tube, 122mm, 2S1 battalion which is organic to the regiment and one or two 18 tube, 152mm, 2S3 or 2S19 battalions allocated from the division. The NTC OPFOR is usually allocated a two battalion RAG for its defensive scenarios while a more robust three RAG battalion is used for MRR attacks. The result of the NTC laydown is that the OPFOR's artillery allocation in terms of tubes per kilometer actually falls short of the general norms the Russians stipulate for an attack along a supporting axis, which is 40 tubes per kilometer.²⁰ In the NTC OPFOR supporting effort regiment's zone, the number of tubes, including the 2S1 battalion and a battery of 120mm mortars will total only 90. This falls 70 tubes short of the 160 required in a 4 kilometer sector, as provided in the example. According to Russian doctrine, a smaller number of tubes per kilometer is acceptable if chemical strikes are planned to "shape" the battlefield, that is, to force the BLUFOR maneuver into or away from a geographic area to gain positional advantage or facilitate massing of fires.²¹ The NTC OPFOR regiment employs both persistent and non-persistent chemical strikes exactly for this purpose, so the reduced number of tubes falls well within doctrinal guidelines. The above mentioned article in The

Voroshilov Lectures says that a main effort DAG will comprise four to five battalions while a supporting effort division's DAG may consist of between one to three battalions.²² Although NTC Threats may make some compromises or assumptions in establishing sector widths and a division's allocation to its main and supporting efforts, the procedures it uses in arriving at the two battalion DAG configuration is consistent with Russian doctrine.

Positioning and Movement

How and where the DAG is positioned on the NTC battlefield in various force on force missions is a critical aspect in training the brigade combat teams. Since OPFOR doctrine is quite specific on when and where a DAG is to be positioned to provide fire support, NTC and OPFOR planners work together to portray a doctrinally accurate picture of a DAG's positioning in the brigade's zone. The brigade staff, particularly the S2 (intelligence officer), must estimate how the OPFOR artillery will influence the friendly mission based on its position relative to friendly and enemy forces. An inaccurate or doctrinally incorrect picture causes brigade staffs to develop correspondingly incorrect actions to either counter or at least attempt to mitigate the DAG's potential effect on the friendly mission. To set the optimum training conditions, then, it is essential that the NTC represent a doctrinally positioned DAG.

As an MRD commander's asset, the DAG is positioned where it can ensure division success.²³ Most U.S. Army doctrinal manuals template the DAG between six and eight kilometers from the forward edge of the battle area (FEBA). The FM 6-20-30, for example, locates the DAG in a "goose egg" or grouping of three battalions in an ellipse or irregular circle, astride the main and secondary effort regiments of the MRD between six and eight kilometers from the FEBA.²⁴ It is important here to note that the diagrams in field manuals depicting DAG or RAG positioning are "doctrinal templates," and do not necessarily reflect an

accurate application of doctrinal principles that apply to the conditions of the battlefield (enemy, terrain, weather) as they exist at a particular time. A template simply represents the DAG's standard deployment pattern for a given type of operation irrespective of battlefield conditions. Most field manuals show artillery groupings configured for a motorized rifle regiment's attack from the march but do not depict or explain how the DAG is employed in a defense or meeting battle formation. The field manuals are useful in providing a fundamental understanding of RAG and DAG positioning in a spatial context but lack the detail that explains artillery grouping movement and positioning for each of basic offensive and defensive mission type scenarios.

NTC planners, consisting of a two man scenario writing team and the OPFOR fire support analyst, apply the doctrine contained in the TRADOC 350 series to the NTC battlefield to show an accurate picture of OPFOR artillery. For each of the three standard force on force missions, movement to contact, deliberate attack and defense in sector, the rotational brigade receives a copy of the 52nd Infantry Division (Mech) operations order containing an intelligence estimate and a complete set of 1:250,000 and 1:50,000 operations and intelligence graphics.²⁵ The graphics are templates which portray the location and movement of the Krasnovian regimental and divisional artillery groups exactly in accordance with Russian doctrine.

NTC planners must blend doctrine and the automation capabilities of the TAF's SUN computer to accurately depict artillery positioning and movement. Since the NTC has neither the requisite number of actual Former Soviet self propelled artillery pieces nor the personnel to operate them, all OPFOR artillery is notional and represented exclusively as icons or symbols in the SUN computer. The icons appear on a variable map scale screen which allows analysts to move and position the weapon systems according to their doctrinal

location and range capabilities. Since the SUN computer screens are not large enough to display every icon in a regimental formation during the course of a battle, movement and positioning are represented by time separation based on doctrinal vehicle speed, terrain and visibility. Since the brigade staff naturally does not have access to the TAF computer screen, movement of the artillery groups beyond the visual range of brigade assets is conveyed to the staffs in the form of master events list (MEL) radio messages. The messages, written by the rotation scenario team, take the form of intelligence or spot reports from notional 52nd ID assets. Each report corresponds to a time driven collection plan issued to the brigade staff. For example, a spot report may indicate that at 0230 hours a corps long range surveillance team identifies one tank and two BMPs at Named Area of Interest (NAI) 10. The division's collection plan, provided to the brigade staff, will indicate a combat reconnaissance patrol (CRP) at NAI 10 at or about 0230 hours. In addition, the TAF will position the artillery groupings so that they match both the MEL traffic and the collection plan. The brigade staff applies this intelligence to doctrinal norms to paint the enemy artillery situation. For example, if the MEL traffic passed to the brigade indicates that a corps long range surveillance team identifies a 152 millimeter 255 battalion occupying a firing position, the brigade S2 can use the collection plan to identify the battalion as part of the DAG by comparing its position in respect to other maneuver and support units which have also been represented in the S2's graphics and the MEL traffic up to that time. Since OPFOR artillery is notional, until it fires and can be acquired, the brigade is dependent upon the division to provide intelligence on suspected or observed locations. This is the general procedure for all force on force mission scenarios.

Motorized Rifle Regiment (MRR) Meeting Battle

In the MRR meeting battle or movement to contact, all artillery units are arranged in time and/or space to depict a doctrinally correct

regimental attack formation. The 2S1 battalion maneuvers between the forward security element (FSE) and the advance guard main body (AGMB). The regiment's battery of 2S1s maneuvers with the FSE. The RAG follows closely behind the main command post (CP) near the front of the MRR main body column and deploys into firing positions once it is in range to support the regiment's main body.²⁶ The DAG marches behind the first echelon's regiment until it can occupy positions which allow it to range advancing enemy columns.²⁷ Practically speaking, the DAG would have to be on a separate route from the first echelon regiment in order to occupy its firing positions without disrupting the column's rate of advance.

Since the OPFOR artillery is invisible to the BLUFOR, planners use time separation to represent both the movement of artillery groupings in the march formation and the earliest time that they could bring the BLUFOR under fire. The NTC uses the "30-60" minute rule as a doctrinally based guideline for portraying where the RAG and DAG would be located in time and space relative to the visible OPFOR combat vehicle formations. For example, the OPFOR's combat battle instructions authorize the RAG to fire 30 minutes prior to the forward security element (FSE) crossing the line of departure (LD). The DAG is authorized to fire 60 minutes prior to the FSE crossing the LD.²⁸ The time of opening fire is based on a known or visibly identifiable combat formation, such as the company-sized FSE, crossing a known point or line of reference that can be inferred or predicted by the BLUFOR S2. The RAG firing at or about 30 minutes before the FSE LDs allows the BLUFOR staff to determine which grouping is firing based on a regimental march formation template. Given the standard 20 km rate of march and the effects of RAG fires that can be seen with the help of the NTC's full-time civilian firemarkers, the staff can infer that the RAG is the firing unit because of its location in time and space relative to the movement of the FSE. While the "30-60" minute rule is a useful planning

tool for both the OPFOR and TAF fire support analysts, it is still an imperfect means of representing notional OPFOR artillery. For example, if the OPFOR uses the RAG's 2S1s to fire smoke to screen the movement of the main body, the 20 km rate of march, a time of opening fire 30 minutes after the FSE LDs and a maximum range of only 15.3 km is likely to place the 2S1 within visual range of BLUFOR observers. The fact that the NTC's doctrinal timelines show that the artillery should be seen conflicts with the fact that the notional artillery cannot be seen. While the "30-60" minute rule may exacerbate the contradiction between doctrine and battlefield reality, it represents a fair attempt to replicate RAG and DAG movement and positioning in the MRR meeting battle formation.

MRR Attack from the March

U.S. doctrinal manuals depict the DAG occupying firing positions in the main strike sector of the division's attack from three to six kilometers from the forward edge of the brigade combat team's defense.²⁹ Since the DAG will attack targets up to 20 kilometers beyond the line of contact with friendly forces, positioning the DAG three to six kilometers from the forward positions of the friendly defense allows the DAG to accomplish both its close support mission, to include the delivery of chemicals and scatterable mines, and assist the Army Artillery Group (AAG) with the counterbattery mission, if necessary.³⁰ A look at any 1:250,000 scale situation template overlay for this type of mission shows strict adherence to this doctrine. DAGs are positioned well forward, usually directly behind but occasionally adjacent to the RAGs in the division's main strike sector. The same positioning guidance applies to secondary effort DAGs.

In the MRR attack from the march, the NTC and OPFOR planners must show the RAG and DAG executing what Russian doctrine calls phased fires. As in the MRR meeting battle, this is accomplished through time separation. According to Russian doctrine, DAG units move forward at a

rate which facilitates occupation of their pre-reconnioted firing positions about 90 minutes before the MRR deploys out of its assembly areas for the attack.³¹ Once in position and on order from the MRD commander, the DAG would begin Phase I fires. During Phase I, called the fire support for the movement forward, the DAG executes the MRD's fire plan and emplaces chemicals and scatterable mine munitions.³² Appropriately, the NTC employs a "60-90" minute rule to replicate RAG and DAG movement and firing. The CBI, for example, would authorize the DAG to fire 90 minutes prior to the regiment's LD time in order to provide preparatory or Phase II fires and special munitions delivery.³³ At 90 minutes, the time approximates the DAG's correct or doctrinal positioning in time and battlefield space or geographic position. The RAG would similarly be authorized to fire 60 minutes prior to the regiment's LD. Additional guidance is sometimes necessary as a control measure to deconflict potential occurrences which would appear artificial or unrealistic on the NTC battlefield, for example, to prevent BLUFOR observation of an administrative OPFOR assembly area. The Rotation 95-08 CBI, for example, directs all OPFOR artillery to position west of a north south grid line for Phase I fires. In addition, it requests that OPFOR planners provide a graphic or matrix indicating RAG and DAG firing positions in order to verify doctrinal correctness.³⁴

MRR Defense

Positioning of the DAG in the MRR defense is similar to that of the MRR attack from the march. The DAG will locate within 10 kilometers of the FEBA while the RAG positions within about four kilometers from the FEBA. NTC planners usually position the DAG immediately to the rear or adjacent to the RAG, straddling the boundary between the main and supporting effort regiments. The standard entry in the 52nd ID (M) intelligence estimate is that the Krasnovians employ BM-21s and 2S3s "well forward" in the defense.³⁵ This configuration allows the DAG to

execute defensive Phase I fires and to provide effective counterbattery support throughout the defense.

Movement Planning

Movement planning for RAG and DAG battalions, like tube allocation and density of fire, is determined in accordance with norms. NTC applies validated OPFOR movement planning norms when planning and executing DAG battalion movement in the TAF. For BM-21s, in particular, NTC's planning factors precisely mirror OPFOR average times for displacement and movement and occupation of firing positions. In the NTC Rules of Engagement (ROE), planning factors govern both OPFOR and BLUFOR cannon and rocket artillery. Using the Notional Artillery/Radar Movement Table, to move a distance of five kilometers, for example, requires 45 minutes.³⁶ This time includes displacement, movement and occupation. Applying the five kilometer factor to the movement table in the 1986 edition of Soviet Ground Forces:

		<u>Time in Minutes</u>	
Evacuation of Firing Position		Movement per Kilometer	Occupation of Firing Position
<u>Weapon</u>	<u>Day/Night</u>	<u>Day/Night</u>	<u>Day/Night</u>
BM-21	7/9	3/3.5	23/32 ³⁷

Using the norm for day movement at five kilometers, then:

$$7 \text{ minutes} + (3 \text{ minutes} \times 5 \text{ kilometers}) + 23 \text{ minutes} = 45 \text{ minutes}$$

The same method is applicable to any distance factor. NTC daylight movement replicates Russian norms exactly. The only disparity between OPFOR and BLUFOR movement is that notional OPFOR artillery movement factors are a constant value because movement is accomplished exclusively in the TAF's SUN computers and is never subjected to the ramifications of human error, the effects of weather or fluctuations in

terrain trafficability, all of which affect the BLUFOR's direct support battalion. That is, OPFOR artillery never gets lost or misoriented and never gets called out of action for committing safety or procedural infractions. The ROE's focus is to retain a level playing field for OPFOR and BLUFOR artillery and, this objective is accomplished by using the same factors throughout.

Weapons Effects

NTC uses a weapons effects table to derive the number of rounds required to destroy, neutralize or suppress a given target. This equates in principle to the OPFOR method of applying expenditure norms to achieve a desired density of fire. Density of fire here refers to the number of rounds allocated to a target hectare.³⁸ The NTC equivalent is the indirect fire casualty assessment box (IFCAS), a 250 meter radius circle. To achieve "effects," an opposing force's target(s) must be within the circle and the shooter must have fired a sufficient volume of ammunition to destroy the vehicle(s). While Russian doctrine employs precise mathematical equations to determine the exact number of rounds required to achieve a desired effect, the NTC's guide is much simpler and applies the expenditure norms for OPFOR artillery expressed in the TRADOC Pamphlet 350 series. The most recent NTC ROE edition (July 1993) does not contain artillery weapons effects tables, but the rule is simply that in order to destroy a tank, either M1 or T-80 or T-72, an opposing force must fire 108 rounds of high explosive (HE) or 54 rounds of dual purpose improved conventional munitions (DPICM).³⁹ For a 152mm howitzer to neutralize a tank in a hastily prepared position, the howitzer must fire a minimum of 110 HE rounds. A 122mm 2S1 typically found in RAGs must accurately fire 150 HE rounds. While both systems at the NTC fire only high explosive, for an MRR attack, a 2S1 battalion would have available 2160 HE rounds, a more than adequate capability for neutralizing or destroying tanks within doctrinal expenditure norms.⁴⁰

TRADOC expenditure norms compare favorably with actual Russian doctrinal norms. For example, using the expenditure norms table in Soviet Ground Forces, a BM-21 must fire 510 rounds to achieve "annihilation" of an opposing force missile launcher.⁴¹ According to TRADOC 350-14, 510 rounds will also annihilate a U.S. MLRS. In addition, Russian expenditure norms for the 152mm 2S5 gun, an NTC DAG weapon system, seem to correspond with the TRADOC 350-14's expenditure table. Both references indicate that 200 HE rounds will annihilate a U.S. missile launcher.⁴² While in reality, a considerably fewer number of rounds may be required to destroy a target, the NTC weapons effects for DAG systems are faithful to Russian doctrine.

The Role of the DAG

Controversy surrounds the DAG's role in the attrition of BLUFOR maneuver forces. Doctrinal manuals differ in their description of mission priorities for the DAG. It is clearly positioned for close support but possesses the range capabilities to engage deep targets for the purpose of counterbattery and counterfire. When the DAG fires, the devastating effects of repeated BM-21 strikes and the range advantage of the 2S5 guns produce attrition rates which often render the lead task force in a brigade attack combat ineffective. Although DAG fires are not the sole contributing factor to BLUFOR failures, when the DAG is employed in a close support role, the attrition it inflicts on the BLUFOR is significant. The problem is that when brigades suffer heavily from artillery fire, they never have the opportunity to practice the most difficult and most critical maneuver tasks defining combat readiness, i.e., close assault, seizure of an objective, reorganization and consolidation. NTC DAG employment must be consistent with doctrine, yet it must not detract from the NTC's larger purpose.

BM-21 strikes would not be an issue if they supported an OPFOR regiment along the division's main axis of attack. In fact, with only two battalions comprising its DAG, an MRD or 11th ACR commander would be

inclined more realistically to focus his available DAG assets on his main axis to achieve the density norms that define success. However, the NTC model, by design, represents a supporting effort regiment in a supporting effort division's zone with only 25 percent of the combined arms army's (CAA) assets.⁴³ The NTC's experience with attrition rates attributable to artillery prompts two critical questions: 1) Does Russian doctrine define a close support role for a supporting effort division DAG? 2) If it does, to what degree is the NTC DAG employed in close support?

U.S. doctrinal sources vary in their interpretation of the DAG's mission priorities. There seems to be equal evidence for both close support and counterbattery. The FM 6-20-30, Fire Support for Corps and Division Operations, says that the DAG's focus is "primarily in support of close operations against friendly maneuver."⁴⁴ The manual says that the DAG will engage U.S. artillery "as required," and adds that the primary targets for artillery are friendly maneuver forces . . . not friendly artillery."⁴⁵ The manual clearly relegates counterbattery and counterfire to a secondary mission. In contrast, TRADOC 350-14 implies a more active counterfire role. While the DAG provides "general support," a U.S. doctrinal term that describes artillery fires in support of the division as a whole, the DAG "assists the army with the counterbattery mission, and if capable, it may perform the mission itself."⁴⁶ In the Battle Command Training Program (BCTP) Warfighter inbriefing, the players are told that the DAG "assists with counterbattery."⁴⁷ In a departure from every other piece of literature here, Baxter says in his Soviet Airland Battle Tactics that the counterbattery mission is divorced from any artillery grouping. According to William Baxter, a missile battalion (BM-21) is assigned a counterbattery mission and works in concert with dedicated reconnaissance and weapon locating assets in what he describes as an

"independent hunt for artillery."⁴⁸ Sources are divided on the DAG's role of close support and counterbattery.

The 1992 edition of The Voroshilov Lectures clearly delineates DAG mission priority:

1. Fight enemy nuclear delivery means.
2. Destroy and suppress enemy immediate reserves.
3. Destroy and suppress enemy artillery.
4. Reinforce RAG fires.⁴⁹

Although these lectures antedate the collapse of communism and subsequent force downsizing, the focus on the destruction of nuclear delivery means still occupies a prominent place in the Russian psyche. At the time The Voroshilov Lectures were written, the M109A3 155mm self propelled howitzer and the M110 203mm (8") self propelled howitzer were the standard tactical nuclear weapons delivery systems that were undoubtedly plotted in every DAG's range fan. If nuclear weapons are dropped from the equation, the DAG's first concern, according to the Lectures becomes the destruction of reserves, which is clearly a close support mission. If nuclear weapons no longer constitute a viable concern, then the DAG's first mission is indeed close support, followed by counterartillery.

An additional complication is the fact that the definition of missions for the DAG may be fundamentally incorrect. According to Lieutenant Colonel Victor Tchernev, a Bulgarian infantry officer, it is dangerous to conceptually associate or limit the DAG to specific missions. The DAG represents "pure firepower in the hands of the commander," and he will use the DAG in whatever role he deems necessary to accomplish his mission.⁵⁰ This role includes the support of a secondary effort regiment. If DAG priorities had to be stipulated, said Tchernev, its focus would be:

1. Close support of the main effort regiment.
2. Close support of the supporting effort regiment.

3. Support for the main effort counterattack.

The commander, simply put, would provide artillery to whatever zone or sector whose success contributed to mission accomplishment. This echoes the OPFOR doctrine explained in TRADOC Pamphlet 350-14, that DAG support would be "concentrated on the regiment making the best progress." This assertion is consistent with the U.S. doctrinal understanding of the DAG as an instrument of both flexibility and centralized control.

That the DAG could fire in close support of a secondary effort regiment was corroborated by Major Vladimir Krasavin, a former G2 intelligence officer of the Russian 90th Motorized Rifle Division: "Everything depends on the mission, there are no absolutes," and in the context of DAG utilization, the MRD commander can do anything within the confines of his zone or sector as long as it does not change the higher commander's plan.⁵¹ If such action entails shifting DAG assets to an adjacent first echelon regiment in order to assist the main effort he would do that. Even in a two battalion DAG, if the situation demanded it, the commander would restrict the effects of his rockets and tube artillery to the main axis strike zone. Engagement of targets outside the main axis sector, however, would be the MRD commander's decision. Interestingly, then, it is the FM 6-20-30, Fire Support for Corps and Division Operations, that may provide the most accurate interpretation of the DAG's role on the battlefield. Instead of associating Russian artillery groups with specific mission types, it may be more appropriate to think of the DAG as the MRD commander's flexible firepower tool ready to accomplish whatever fire support tasks that contribute to mission success.

The NTC's employment of DAG assets generally adheres to the principle that the DAG is the MRD commander's asset, positioned on the battlefield where it can best influence the MRD sector. The NTC policy here is consistent with doctrine in that the division commander, a role played by the 11th ACR commander, is the approving authority for DAG

employment in support of regimental operations.⁵² Yet, Operations Group and OPFOR planners disagree on exactly how much support a secondary effort regiment can receive before variations present an unrealistic picture of division assets diverted from a main strike zone. NTC planners must achieve the critical balance between training utility and doctrinal function.

The DAG's primary purpose on the NTC battlefield is a practical one; it is the only means the OPFOR has for employing special munitions. Although a Russian MRD commander has at his disposal a number of chemical and scatterable mine delivery assets (152mm 2S3 in the RAG, HIND helicopters), the preferred means of delivery are the multiple rocket launchers in the DAG (BM-21).⁵³ Doctrinally, special munitions are fired in the offense at the beginning of Phase I approximately 30 minutes before the regiment crosses its LD and in the defense as the enemy maneuvers to its LD.⁵⁴ Special munitions (persistent, nonpersistent chemical and scatterable mines) are part of the MRD commander's fire plan. The fire plan consists of what the OPFOR calls "MRD main targets" or the targets which the 11th ACR commander deems critical to the MRD's success.⁵⁵ Chemicals complement the fire plan and are typically employed to shape the battlefield, that is, either to deny the BLUFOR brigade use of an area or route or to compel the brigade to maneuver into an area in which the OPFOR can mass the effects of its direct and indirect fire systems.⁵⁶

While the purpose and timing of chemical munitions delivery is doctrinally sound, the guidelines regarding the employment of chemicals in a supporting effort regiment's zone or sector are less distinct. According to William Schneider, chemical strikes are executed against enemy forces on the main attack axis.⁵⁷ A supporting effort regiment can plan or nominate a chemical target, but a strike will be executed or fired only if it supports the division commander's plan. Fort Leavenworth's Combat Training Center, BCTP, coaches player units during

their WARFIGHTER exercises that a persistent chemical agent may be an indicator of the OPFOR main effort zone or sector.⁵⁸ Again, hard and fast rules are dangerous. If the MRD commander decides to target the BLUFOR reserve, he may choose to employ a persistent nerve agent in the secondary effort regiment's zone in order to isolate the battlefield. The more prudent and experienced brigade staffs apply OPFOR doctrinal chemical employment principles to the situation and rely less on rigid interpretation of Russian doctrine. There seems to be fewer restrictions on the use of non-persistent chemical agents. Non-persistent chemicals are used more freely at NTC and are employed routinely in both offensive and defensive phase I fires.⁵⁹ In BCTP, non-persistent chemicals do not hold a comparable level of significance; nor are they employed with the same frequency as NTC. The disparity may be a function of CTC conditions.

Whether the MRD commander is more likely to employ his persistent nerve munitions in the main effort or the supporting effort, the capability to replicate chemical munitions delivery is an important training facilitator. Most deliberate attack scenarios require an OPFOR motorized rifle battalion (MRB) to defend a much larger sector than what a unit of that size would realistically defend. Reduced strength MRBs, usually consisting of seven main battle tanks and 17 BMPs, (Bronyirovannaya Mashina Pekhoty--Armored Infantry Vehicle) for example, would normally defend a three kilometer or, at most, a five kilometer sector.⁶⁰ At the NTC, a combination of terrain and environmental restrictions, including protected dry lake beds and archeological sites, usually require an MRB to defend a five to eight kilometer wide sector. In this case, the OPFOR would be authorized to employ persistent agents to shape areas which it could not cover with its direct fire systems. In addition, the Chief of Operations Group will, on occasion, requires a persistent agent to be fired by DAG assets as a maneuver control measure to "shape" the fight by causing the opposing forces to maneuver into

each other or keep one or both forces out of a restricted area. Finally, DAG chemical delivery provides chemical defense training opportunities for the brigade combat teams. Since most potential U.S. adversaries possess a chemical and artillery mine delivery capability, the ability to replicate these OPFOR combat multipliers must be carefully weighed against the issue of doctrinal fidelity. While use of DAG assets to employ chemicals in a secondary effort zone is not likely, it is not an impossibility. With the exception of the Combat Maneuver Training Center in Hohenfels, Germany, no other CTC replicates the use of chemicals in a mid to high intensity simulation scenario. For continental U.S. (CONUS) based soldiers, it was NTC chemical defense training that provided some measure of confidence against the Iraqi chemical threat during Operation Desert Storm. The planning and integration of NBC defense in the scheme of maneuver from brigade to platoon is an invaluable training opportunity. Its legitimacy here, then, is that it provides the brigade combat teams with the training experience of anticipating, planning and actively defending against a proven threat.

The Question of Close Support

The issue of DAG systems providing close support fires to the OPFOR regiment is as much a doctrinal issue as it is a training concern. As a general support asset, by definition, the DAG's focus is shifted to support a secondary effort only on the order of the MRD commander. Like U.S. artillery, Russian artillery and ammunition are not inexhaustible; a targeting process ensures that attack assets are apportioned against the right targets at the right time. Control measures assist in the critical task of managing precious resources. Doctrinal control measures also protect training objectives. If NTC applies its OPFOR simulations according to doctrine, then BLUFOR units can measure their performance against an established, validated standard. However, the unrestricted use of a general support asset such as the BM-21 is

nondoctrinal, and, given its lethality as an armor killing system, can severely affect maneuver training objectives. The supporting effort regimental commander is simply expected to accomplish his mission with the assets he has without additional help from the division.⁶¹

Since the MRD commander never relinquishes control of his DAG, the OPFOR has established criteria or conditions under which the MRD commander authorizes the DAG to fire in close support. The majority of DAG assets are employed during Phase I and II fires, in which the BM-21 and 2S5 attack the MRD's main targets and employ special munitions.⁶² During the employment of persistent chemicals in particular, the OPFOR MRB and regimental commanders nominate a chemical target by associating it with a task and purpose for attack. The target nomination is briefed to the Chief of Operations Group at least two hours before the battle, at which time it is either approved or disapproved. The same procedure obtains for artillery delivered mines, but in this case the planners authorize the OPFOR one or two minefields for planning. Once the nominated targets are approved, no other chemical or artillery delivered minefield target can be fired. This restriction replicates the strict planning guidance that would normally be imposed on a division's fire plan and precludes the OPFOR from firing chemicals and mines at targets of opportunity. It is after Phase II that the MRD commander must authorize DAG fires in the supporting effort regiment's zone.⁶³ According to NTC Threat Management, there are target types and conditions which would legitimize MRD commander authorization. First, the 11th ACR commander would approve fires on a BLUFOR tactical operations center (TOC) to disrupt command and control.⁶⁴ The commander would also authorize fires on any BLUFOR artillery located by reconnaissance and within range of either the 2S5s or BM-21s in the the DAG.⁶⁵ These criteria reflect the DAG's assistance in the proactive counterfire role.⁶⁶ Although the AAG and Army Group of Rocket Artillery (AGRA) are the primary counterfire groupings, AAG assets may not be

positioned to render support, since a secondary effort division is resourced with adequate assets to accomplish its mission. The 11th ACR commander would also use the DAG to exploit reconnaissance reporting.⁶⁷ The priority ascribed to reconnaissance here aptly reflects the OPFOR view of the marriage between reconnaissance and artillery. OPFOR will try to locate 75 to 80 percent of all possible targets and 100 percent of artillery and command posts.⁶⁸ If unsuccessful in his division and regimental reconnaissance efforts, the OPFOR regimental commander may even seek approval to form and launch an independent reconnaissance detachment to achieve the 75 to 80 percent solution.⁶⁹ Finally, if the RAG is displacing and moving to another firing position or is engaging another target, the 11th ACR will most likely authorize DAG assets to fire on high payoff targets in the regiment's zone.⁷⁰ Despite well reasoned control criteria, an MRD commander may authorize DAG fires under almost any condition if the artillery support contributes to overall success.

That an OPFOR division commander would use the DAG to assist his supporting effort regiment speaks to what some U.S. planners call the "METT-T escape clause."⁷¹ This "clause" allows for lapses in adherence to doctrine to compensate for unexpected or unforeseen enemy actions or other conditions which demand the invocation of soldierly common sense. As in U.S. doctrine, "there are no absolutes," and a division commander would surely authorize DAG fires if the conditions were such that divisional fires in the supporting effort sector became critical to the division's success. However, these conditions do not represent the norm, and consistent portrayal of the DAG with reponsiveness comparable to the direct support RAG presents a false picture. Adherence to a doctrinal norm provides a training baseline for a learning unit and establishes a standard for training progress. The baseline principle here is that the MRD commander's assets will be concentrated in his main strike sector, and he will focus those assets

accordingly. Historically--and BCTP and NTC both adhere to this--the supporting effort division's DAG will allocate approximately 75 percent of its firepower to the main effort with the other 25 percent going to counterfire and the supporting effort regiments.⁷² If a commander were to authorize DAG fires to his supporting effort regiment (after Phase II), that support would be limited and temporary, especially if the DAG had only two battalions. Fort Leavenworth's World Class OPFOR maintains that it would be unusual for the DAG to fire more than one mission in the supporting effort's zone, and then only if the commander believed that striking a particular target would increase his chances for success.⁷³ The DAG's BM-21's after all, are used "only against the most important targets," and it is more likely that the "important" targets would be located in the division's main strike sector.⁷⁴ Empirical data and written observations in NTC take home packets, however, show that the NTC's DAG contributes substantially more firepower to the supporting effort zone than what is both justified doctrinally and espoused by NTC and OPFOR planners. Various types of evidence, including the number of close support missions conducted, the volume of DAG fires supporting the regiment and the corresponding BLUFOR attrition demonstrate that the DAG is as responsive as the regiment's own artillery and even more lethal.

Application and Outcomes

The NTC empirical data obtained from OPFOR records of fire show that the DAG is employed in close support of the secondary effort regiment with a frequency that is inconsistent with the intent of the DAG's NTC role. In the typical NTC scenario, then, the majority of DAG fires should be directed against the DIVARTY's MLRS. The majority of the DAG's close support missions would normally be fired in the division's main effort zone. Of the seven deliberate attack battles studied in detail, only one showed a higher number of DAG counterbattery missions than close support missions. In one-half of the battles, the

number of close support missions was double the number of counterbattery missions.

Table 1.--DAG Missions: Counterbattery or Close Support?⁷⁵

<u>Rotation</u>	<u>Battle</u>	<u>RAG</u>	<u>DAG</u>	
		<u>Missions</u>	<u>Counterbattery</u>	<u>Close Support</u>
93-05	*DATK TD3	38	5	19
93-08	DATK TD14	39	10	28
93-10	DATK TD9	14	5	6
93-10	DATK TD13	26	4	24
95-06	DATK TD14	20	4	6
95-07	DATK TD9	70	10	7
95-08	DATK TD14	20	0	4

* Deliberate Attack

The high number of close support missions for each battle is simply not indicative of a general support tool, particularly when the NTC OPFOR regiment is not the MRD's main effort. During the entire 95-08 Rotation in May 1995, in eight force on force battles, the DAG's BM-21s fired only one counterbattery mission. An additional training issue here is that the planners do not customarily depict for the BLUFOR an adjacent OPFOR unit situation that explains the preponderance of DAG fires in the brigade's zone. Precisely for the sake of consistency in training, scenario writers adhere to the principle that the majority of the OPFOR's assets will be dedicated to the MRD main effort. The disparity between universally accepted OPFOR doctrine and what actually occurs on the NTC battlefield adds more confusion to what is already, by its nature, a difficult training environment. The counterbattery mission for the NTC DAG is clearly ancillary to close support.

The OPFOR artillery's attack of targets from grid calls for fire as opposed to preplanned target missions also indicates a preference for targets of opportunity rather than adherence to a fire plan. The fire plan is the list of targets which has undergone the scrutiny of a detailed targeting process to identify precisely which enemy targets must be attacked to achieve success. According to a 9 January 1995 memorandum explaining the role of the DAG in the delivery of special munitions, the OPFOR commander's intent is to use his DAG assets to execute the fire plan.⁷⁶ DAG assets provide the best support when fired during a fire plan because the plan's targets are based on the anticipated enemy course of action. Therefore, the fire plan apportions precisely the number of attack systems and amount of ammunition required to defeat a target. In contrast, grid missions attack targets of opportunity which require the MRD commander's approval for DAG support. Such missions are can be lucrative if they meet the commander's attack criteria. Until recently, the OPFOR historically fired more grid missions than fire plan targets. According to the 1990 RAND report, "Applying the National Training Center Experience: Artillery Targeting Accuracy," data collected over 42 different battles during 1988 show that the OPFOR fired 48 percent more grid missions than fire plan missions in the offense and 60 percent more grid missions than target missions in the defense.⁷⁷ The proportion of grid missions to fire plan missions seems to have decreased in recent years, however.

Table 2.--DAG Close Support Missions: Grid vs Fire Plan⁷⁸

<u>Rotation</u>	<u>Battle</u>	<u>Grid Mission</u>	<u>Fire Plan Mission</u>
93-05	DATK TD5	13	6
93-08	DATK TD14	16	20
93-10	DATK TD13	11	13
95-06	DATK TD14	2	4
95-07	DATK TD9	6	3
95-08	DATK TD14	4	0

This table indicates that the OPFOR fired about 50 percent more grid missions than fire plan missions. The OPFOR's frequent use of grid missions indicates division level responsiveness and the availability and diversion of assets that doctrinally should be dedicated to the main effort.

The amount of DAG ammunition expended in the OPFOR regiment's sector is similarly indicative of support to a main effort. Of the six deliberate attack battles sampled, only one reflected the 25 percent DAG expenditure norm for a supporting effort regiment. In the remaining five battles, the DAG's ammunition expenditure (both 2S5 and BM-21) ranged from 67 percent in Rotation 93-10 (TD13) to 77 percent in Rotation 93-05.⁷⁹ The NTC's DAG routinely expends a main effort's share of ammunition during defensive operations. DAG ammunition expenditure is even comparable in some cases to RAG expenditure. While the DAG expended an average of between 67 to 77 percent of its ammunition in the six battles sampled, the OPFOR's own direct support artillery mechanism, excluding the mortars, expended an average of 80 percent of its munitions.⁸⁰ The proportion of DAG assets dedicated to the secondary effort raises the issue of how much is being used to support the adjacent main effort. Because the main effort is purely notional, the OPFOR is not required to account for the allocation of artillery and rockets to that main effort. The result is that the OPFOR regiment is the "only show in town;" ergo, it receives all the DAG's support. The numbers suggest that the NTC DAG's focus is never on the main effort strike zone. In reality, the DAG is immediately responsive to the actual OPFOR regiment fighting the BLUFOR brigade.

The number of DAG close support missions, coupled with the average ammunition expenditure for MRB defense battles, results in substantial BLUFOR attrition rates. Empirical data extracted from OPFOR records of fire show that the DAG, and in particular, the BM-21, is an

extraordinarily effective armor killer. A BM-21 rocket box contains six individual aimpoints, each signifying 40 HE rockets. According to the NTC's last published artillery assessment tables, only 20 rockets are required to destroy a tank.⁸¹ Liberally planned along the BLUFOR's LD and axis of attack, the 240 round rocket boxes can produce potential assessments that approach 40 to 50 percent attrition of a task forces' combat power before lead elements can reach direct fire range of the MRB's defenses.

Although BDA tables in take home packets reflect the final assessments of vehicles destroyed, the NTC CATIES vectoring system provides the best objective measure of actual artillery kills. Vehicles may be "killed" more than once, that is, a vehicle may fall within the IFCAS box on the LD and again while conducting a defile drill. If the OPFOR initiates an accurate mission and if the BLUFOR vehicle is in the IFCAS box, the TAF will activate the CATIES system. On the ground, the vehicle's crew and OCs will observe the pyrotechnics for a like number of attacks. If the CATIES detonates, the vehicle has been "vectored" and has received the requisite number of artillery or rockets strikes to be destroyed, in accordance with the assessment tables. In view of the distances required to maneuver and the normal frequency of DAG attacks, it is conceivable that 30 to 50 percent of a task force can be vectored before reaching its objective. The OPFOR records of fire provide the most comprehensive record of vectored vehicles.

Most take home packets lack complete OPFOR records of fire, but observer controller narratives clearly convey the magnitude of the DAG's role in close support. A passage from a typical narrative states:

TF 1-18 main body crossed PL Troy at 0603 hrs. The lead team crossed PL Macon at 0617 hrs. TF 2-69 LD'd at 0628. The lead Co/Tm (1-18) was hit by 240 (rockets) at 0637. By 0643 hrs, TF 2-69 crossed PL Troy. TF 1-18's lead Co/Tm was hit again by 240 (rockets) . . . At 0707 hrs and 0710 hrs, 240 (rockets) each fell

on TF 2-69 and TF 1-18. TF 2-69 was Hit by 108 rounds at 0717 hrs. At 0721 hrs., 324 rounds TF 2-69. By 0750 hrs., TF 1-18 entered OBJ Jet and received 324 rounds of artillery.⁸²

Some OC observations punctuate descriptions of the carnage with carefully documented accounts of each artillery strike. For example, "At 0724 hours, the brigade's BDA from indirect fires continue [d] to swell as the lead elements crossed PL Ripper."⁸³ Some observations refer to the "extremely accurate and deadly indirect fires," which seemingly convey the frustration of BLUFOR units:

It appeared that the brigade would push through OBJ Chicago unhindered. Contrary to that belief, TF 1-12 was hit with approximately 240 rockets . . . [and] just as the brigade reached the intended penetration point, the TF was combat ineffective.⁸⁴

The OC perspective is significant because it is the link with the OPFOR records of fire that establishes the essential cause and effect relationship between player actions and player casualties. The OC perspective also serves to indicate flaws in the less personal world of doctrine and combat simulations.

Attrition ascribed to OPFOR artillery has prompted planners to devise doctrinally amenable methods for mitigating DAG effects. The Chief of Operations Group convened a meeting of OPFOR and NTC scenario planners in February 1995 to review standard DAG employment principles in view of the events of a Training Day 13 deliberate attack in the NTC's Central Corridor.⁸⁵ In this attack, a BLUFOR task force was nearly destroyed by DAG BM-21 rocket strikes as it tried to negotiate a notorious choke point commonly referred to as the Brown Pass Complex. The task force was effectively stopped by a lone T-72 and BMP, and the OPFOR exploited the delay and confusion with repeated rocket strikes. Neither task force came close to reaching direct fire range of the brigade's ultimate objective six kilometers distant. The review determined that DAG employment was doctrinal, albeit excessive for a secondary effort regiment. The planners decided to publish a memorandum

to reemphasize the 50 percent rule in adjudicating OPFOR artillery kills. This rule, which applied only to BLUFOR deliberate attacks, called for 100 percent artillery assessment at the time of the attack, but when the BLUFOR unit reached 50 percent of its combat systems, further assessments would cease "to allow the direct fire battle to occur."⁸⁶ Once a unit reached 50 percent combat power, it, in effect, became "immune" to further artillery damage in order to ensure that a training event occurred.⁸⁷ The 50 percent rule addresses the symptom rather than the source of excessive attrition.

This experience, when correlated with OC narrative accounts of similar circumstances, provides grounds to question basic procedures and doctrinal application at NTC. Rules fabricated to sustain BLUFOR combat power facilitate training events but fail to address the larger, more crucial issues of force protection and counterfire. What is the division's role in reducing the DAG and protecting the brigade from the full destructive effects of its massed fires?

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CHAPTER 5
OPFOR ON THE RECEIVING END
COUNTERFIRE

BLUFOR losses to the DAG are exacerbated because the NTC does not provide a proactive mechanism to counter the DAG's effects thereby establishing more favorable conditions for the brigade's fight. All 52nd ID (M) orders and formal briefings outline in general terms the division's plan for deep operations. Deep operations, however, target only maneuver forces and ignore the RAGs, DAGs and AAGs.¹ Despite the 52nd ID(M)'s more than adequate deep strike capabilities, the DAG always goes unmolested, with the result that the brigade begins every battle against a full strength two battalion DAG. NTC's deep operations are generally limited to reactive measures and counterbattery fire. For example, DIVARTY's MLRS will return fire only if the DAG fires. The NTC's failure to account for the DAG's immense destructive capabilities ignores doctrine and plainly sets the conditions for failure rather than success.

The success of the division deep fight is requisite to the success of the brigade close fight. In current Airland Battle doctrine, the two occur simultaneously throughout the depth of the battlefield. The purpose of the deep operation is to attack enemy uncommitted forces before their arrival to influence the brigade's close fight.² Doctrinally, it is the division that has the staff and target acquisition and long range attack systems which are most capable of executing a deep operation. A well synchronized division deep battle employs all available assets, including Air Force air interdiction (AI), Army attack helicopters, electronic warfare (EW) and GS artillery (MLRS)

to reduce, for example, a follow on regiment to the point at which it must stop and defend itself, then reorganize. The intent of the deep fight is to "piecemeal" the enemy so that the brigade in the close-in fight faces a more manageable portion of the enemy's original combat power. The same considerations apply to the DAG. It is one of the two primary targets of a division deep fight.³

Every U.S. doctrinal manual on division or higher level maneuver or fire support emphasizes the importance of inflicting losses on OPFOR artillery groupings. FM 71-100, Division Operations, clearly states that deep operations will focus primarily on enemy artillery and counterattack forces.⁴ FM 6-20-30, Fire Support for Corps and Division Operations, explains that a responsive divisional counterbattery program incorporating available divisional acquisition and attack assets constitutes a viable countermeasure against the OPFOR's ability to mass 140 tubes of divisional artillery.⁵ In addition, in FM 6-20-30's example of a corps commander's concept of the operation, the commander wants to "neutralize at least 60 percent of the RAGs and DAGs in their zones."⁶ Although this is not a good example because a corps commander would focus first on the AAG and AGRA, then the DAG, the example emphatically conveys the importance of countering the enemy's artillery to insure the success of an operation. FM 71-3, Armored Mechanized Infantry Brigade, even features a graphic depicting a brigade ground maneuver deep attack against the DAG.⁷ The best way of attacking the DAG, or any artillery grouping, is to attack it early.

Proactive fires, as a subset of deep operations, de-synchronize the OPFOR's phased fires to destroy OPFOR weapon systems before they can inflict losses on the BLUFOR maneuver force.⁸ Since the DAG is employed both as a close support and counterbattery asset, a reduction in its destructive capacity facilitates greater freedom of BLUFOR maneuver, prevents the disruption of attack formations, and simply allows the

commander to conduct his assault under more favorable force ratios. In addition, proactive fires help to achieve fire superiority. The attainment of fire superiority against a numerically superior adversary requires a counterfire effort that strikes the OPFOR fire support system early, before it can influence the fight. Counterfire, if executed proactively, can wrest the initiative from the OPFOR. If BLUFOR must react, then it is responding too late to damage already inflicted on friendly forces.

Field units and CTCs have demonstrated the utility of proactive counterfire. In October 1993, the 25th Infantry Division Artillery executed a BCTP Warfighter in which the fire support element experimented with techniques and procedures for synchronizing intelligence gathering assets to facilitate proactive counterfire. Using the doctrinally sanctioned "decide, detect, deliver and assess" targeting methodology, the targeting cell was able to develop an 80 percent-correct picture of North Korean artillery positions which the division exploited to good effect with its deep attack assets.⁹ In April 1994, the 4th Infantry Division conducted a BCTP rotation and, like the 25th ID, improved upon its own proactive fires tactics, techniques and procedures (TTP). Key lessons learned were the importance of colocating intelligence with fire support analysis functions, the utility of unmanned aerial vehicle intelligence to timely, proactive counterfire, and the necessity for immediate engagement of enemy fire support systems other than counterfire radar as they are acquired. Application of these lessons resulted in the defeat of enemy high payoff targets more than 75 percent of the time.¹⁰ In each battle, defeating OPFOR artillery early facilitated the brigade's close fight. Observer controllers at Ft. Leavenworth's BCTP actively coach units in planning and executing the corps and division proactive counterfire fights to set the conditions of success for their brigades. As demonstrated in recent BCTPs, "proactive fires work."¹¹

BCTP and NTC differ on the actual employment of proactive counterfire. The World Class OPFOR observer controllers preach it and coach it; NTC virtually ignores it. BCTP observer controllers contend that a division must reduce the DAG, AAG and AGRA by 40 percent in a proactive counterfire effort to establish conditions favorable for a successful BLUFOR defense. In an offensive operation, the division must reduce these groupings by 80 percent.¹² In a typical BCTP scenario, counterfire will reduce the DAG to one battery of BM-21s and a battery of 2S5s.¹³ Attrition rates this high, however, imply the use of corps attack assets as well. A division aviation brigade would be hard pressed, indeed, in terms of time and logistics to inflict such attrition at the depth these attacks require. NTC planners also recognize the doctrinal necessity for striking the OPFOR early with overwhelming firepower. Every NTC division order and briefing outlines a deep battle which includes strikes against the DAG and AAG. Yet, in practice, the proactive fight stops on the printed page.

NTC scenario planning teams incorporate the corps and division deep fight in every order issued to the brigade. During the rotation planning phase, planners use a force laydown matrix which graphically shows how OPFOR units are chronologically introduced into the scenario and "matched" to notional BLUFOR units to depict the corps and division deep fights. The format ensures that every OPFOR unit in a given CAA is accounted for so that proper force ratios are achieved for the rotational brigade. Using the matrix as a guide, the orders detail BLUFOR attack assets and spell out the intent of proactive fires. The commander's intent and his concept of the operation paragraphs within every division order describe the purpose of the corps and division deep fights. In Operations Order 95-02-02 (November 1994), for example, the corps commander's concept of the operation stated, "corps deep attacks, consisting of AI (air interdiction) AHB (attack helicopter) and EW assets will orient on the destruction of the DAG and AAG, then shift to

the destruction of first echelon regiments . . ."¹⁴ In the same order, the division commander's concept of the operation calls for deep attacks . . . to destroy the DAG and isolate the main battle area (MBA) by attriting first 1st echelon regiments by 40%, then shifts to destroy the 11th MRD's ADA, C3I and CLIII.¹⁵

Deliberate attack orders reflect the same emphasis on the DAG but usually specify that the DAG must be neutralized or destroyed before the BLUFOR attack begins in order to preserve combat power for the assault phase. In CONPLAN A, 95-02-01, for example:

DIVARTY will focus the counterfire effort on attriting the DAG by 30% before phase II fires begin.¹⁶

While the division is usually successful in attriting either the AAG and first or second echelon regiments, the division never attacks the DAG despite the doctrinally valid guidance outlined in its own order. The overall impression conveyed is that the 52nd ID is habitually only half successful in its deep fight.

Reactive Counterfire

The reasons for preserving the DAG and not destroying or depleting it in deep fight are varied. One argument is that the NTC's fire support TAF is neither staffed nor equipped to replicate a DIVARTY fire support or deep operations cell which doctrinally plans and executes the deep fight against the DAG. Another point has to do with the DAG's utility to the NTC battle scenario. Its weapons systems, particularly the BM-21s, serve both as the MRD's primary counterfire tool against the BLUFOR DIVARTY's MLRS and as a chemical and minefield delivery system. Without the DAG, the OPFOR is left without a decisive combat multiplier. Whatever the reason, the resultant failure to conduct deep operations is simply inconsistent with U.S. doctrine. This inconsistency forces both BLUFOR and OPFOR to rely exclusively on reactive counterfire, a departure which results in doctrinally inaccurate positioning of assets, assumes that the DIVARTY is capable of

executing effective proactive counterfire, and promotes computer engagements which have no training benefit to the rotational brigade.

The NTC fire support TAF was never intended to replicate the functions of an ad hoc division deep operations cell. The TAF's primary function is to log and assess fire missions and track key events to provide constructive feedback during after action reviews. The current TAF consists of a small number of officers and noncommissioned officers and six or seven civilian employees with varying degrees of fire support experience.¹⁷ Training a TAF in intelligence collection, target value analysis, and deep operations would be an ambitious--and probably unnecessary--undertaking. NTC does not train division staffs but focuses on the brigade staff and below. Division staff functions are transparent to the rotational brigade since the deep fight is completely notional. Master Events List (MEL) traffic is used now to convey intelligence to the brigade regarding corps deep fights against the AAG and AGRA and also the division deep fights against first and second echelon regiments. Even without augmentation, the proactive counterfire fight against the DAG is well within the capabilities of the TAF and NTC.

To ensure that a counterfire fight occurs, nondoctrinal positioning is sometimes necessary to compensate for the MLRS' range disadvantage. Both the BM-21 and the MLRS have maximum ranges of 30 kilometers, but sometimes the mountainous, intervening terrain of NTC will allow BM-21s to engage BLUFOR maneuver elements while preventing the MLRS from ranging the BM-21. Ranging the BM-21, a necessity affording the BLUFOR its only protection against the DAG, has often required the positioning of the DIVARTY's MLRS battery icon well forward in zone, sometimes on or very near the LD, a procedure which is fundamentally inconsistent with doctrinal MLRS positioning. OPFOR analysts have correctly raised the issue that this positioning was nondoctrinal. They also called it unrealistic to assume that the 52nd

ID would position the MLRS so far forward in a main effort zone for the express purpose of ranging the BM-21 and providing fires for a supporting effort brigade.

Recent improvements in OPFOR artillery systems mean that even the most responsive counterfire system cannot offset the U.S. disadvantage. The Russian 2S19, believed to have first appeared in 1990, is built on a T-72 main battle tank chassis, and can fire without deploying spades with an eight round per minute rate to a maximum range of 27.5 kilometers.¹⁸ With rocket assisted munitions, the range extends to 40 kilometers. With a stable platform and no requirement for spades, the 2S19's dwell time is comparable to the U.S. Army's Paladin, the U.S. Army's newest cannon system. The M109A6 Paladin can match the speed of emplacement and firing, but is still outranged by the 2S19. While fielding teams report a 30-second firing capability from receipt of the call for fire, the M109A6's range is only 24 kilometers with dual purpose improved conventional munitions (DPICM) and 30 kilometers with rocket assisted ammunition.¹⁹ The U.S. Army's most effective counterbattery weapons system, the multiple launch rocket system (MLRS) has a best response time (from acquisition to rounds on target) of seven minutes and 15 seconds, given a range to target of 20 kilometers.²⁰ The field artillery community assumes that an enemy system can emplace, fire and displace in five minutes. Clearly, exceeding the training standard is still two minutes too slow to engage a target with a five minute exposure, or "dwell" time. The improvements in OPFOR artillery systems in the last three years have reduced the dwell time substantially.

New techniques for streamlining MLRS engagements have at best reduced response time to less than three minutes. One technique, described in a Field Artillery Journal article, "Stay Hot, Shoot Fast," uses planned targets, but if an enemy target is located at a point other than which has been templated, the technique becomes useless.²¹ A second technique, called the amended fan, allows for a 200 mil right or

left deviation against a planned target. Still, the total mission time for an amended mission is about four minutes, one minute under the expected five minute dwell time, but not fast enough for the apparent capabilities of the 2S19.²² The "Stay Hot, Shoot Fast" technique, however, can be used to good effect if 2S19 batteries or any grouping for that matter, fire multiple volleys from the same position without moving.

Since the DAG-DIVARTY fight becomes purely reactive, and the only systems capable of acquiring and attacking the DAG are all division assets, the reactive counterfire battle against the DAG offers virtually no training value to the rotational brigade. The MLRS can fire only if the Q-37 acquires one of the DAG's firing units. The counterfire battle then routinely devolves into a computerized artillery duel, or "NINTENDO war."²³ The only salvageable training for the brigade here is planning and coordination for Q-37 coverage during the time that the Q-36 is displacing. Because the brigade has no command and control authority over the MLRS, and because the only brigade agency which can monitor the progress of the counterfire battle is the direct support field artillery battalion, the fight is invisible to the brigade and thus provides no training benefit other than the loss of combat power if the counterbattery fight is unsuccessful.

With no proactive counterfire battle taking place at division, the greatest predicament that the rotational brigade staff must contend with is managing the competing demands of a purely reactive counterfire battle and the close fire support needs of the brigade's maneuver task forces. Despite U.S. doctrine, which holds that the counterfire battle belongs at the division level, and a plethora of professional literature from the field supporting this contention, the NTC continues to force the counterfire/close fight responsibility on the brigade staff and the direct support field artillery battalion. The rationale is that the division artillery's general support assets may not always be available

to support a secondary effort brigade's counterfire request. NTC was founded on the principle that a rotational brigade would not represent a division's main effort, in which case the brigade commander would expect all divisional assets from corps for every battle.²⁴ Without these assets, the counterfire responsibility falls on the brigade and the direct support FA battalion, a departure which presents an invaluable training opportunity for the staff, commander and fire support coordinator in planning and executing Q-36 radar employment, and integration of counterfire planning with the scheme of maneuver and mission prioritization. This situation acquires legitimacy in a force projection army in which a regional conflict may force a brigade without its general support artillery to fight the first battle of the next war. The less positive consequence is that demands are placed on a system which is simply incapable of acquiring, tracking and attacking counterfire targets while simultaneously fulfilling its primary purpose of providing close support fires to maneuver.

The NTC deliberately perpetuates the practice of forcing direct support battalions to perform the counterfire mission. It is interesting to note that in FM 6-20-40, Fire Support for Brigade Operations (Heavy), the word "counterfire" is mentioned only once in a sample target acquisition appendix to a field artillery support plan.²⁵ The manual does not discuss the counterfire fight because it is not intended for execution at the brigade level. A 1988 article in the Field Artillery Journal, "Silencing the Red God of War," decried the NTC practice of forcing the counterfire battle on an already overwhelmed direct support battalion. It is only at the division level that the resources and capabilities exist to assemble a "comprehensive counterfire system."²⁶ The brigade's inability to handle counterfire and close support is academic; it simply does not have the assets. A combination of factors, including limited staffing capabilities, the paucity of

brigade sensing assets, and the limitations of BLUFOR artillery, prevent the brigade from effectively managing the counterfire system.

An important limitation is that the brigade staff does not have the requisite number of personnel to manage the details of a counterfire battle and synchronize close support with maneuver. The counterfire mission requires a staff whose positions are mated with each of the critical tasks that comprise the targeting methodology. Unlike the division FSE in which the interval separation of functions corresponds exactly to the tasks of the counterfire mission, the brigade barely has the personnel to manage continuous operations for close fire support. The following table illustrates the constrained personnel situation:

Table 3.--Brigade and Division Fire Support Elements

<u>Personnel</u>	<u>Rank</u>	<u>Bde</u>	<u>Heavy Div</u>	<u>Motorized Infantry Div</u>
FSCoord	COL	1(LTC)	1	1
Dep FSCoord	LTC		1	1
Asst FSCoord	MAJ		4	4
Arty Intel Off	MAJ		1	1
Arty Intel Off	CPT		1	1
FSO	MAJ	1		
Tgt Analyst	CPT	1(LT)	2	2
Intel SGT	MSG		1	1
OPS SGT	MSG		1	1
FS SGT	SFC	1	1	
FS SGT	SSG		2	
FS SGT	SGT		1	
Radio/FS Spec	SPC	2	3	2
TOTAL		5 ²⁷	21	17 ²⁸

The division staff has the expertise to manage the intelligence collection sensors, targeting, and coordination of attack assets to facilitate a deep fight or counterfire battle. The staff can also provide the personnel both to plan both future operations and to execute the current fight, in addition to convening a deep operations cell to plan deep operations. A standard technique in many DIVARTYs is to pass the counterfire mission to the FA brigade headquarters which is similarly staffed with counterfire and targeting personnel.²⁹ In other divisions, DIVARTY retains the counterfire mission because it is usually best acquainted with the scheme of maneuver and current situation. The brigade FSE, meanwhile, with only five personnel besides the FSCoord, does not have the capability of planning and executing simultaneous operations effectively over extended periods. The brigade FSO and his officer assistant, if there is one, comprise over 50 percent of the FSE's senior fire support expertise. The expertise required for planning future and deep operations vanishes when the FSO must fight the current battle.

Even if the DS TOC acquires and fires, there are other problems associated with the rhythm between the close and deep battle. The two tasks, which must be accomplished by one staff, cannot be performed independently because the same attack system must be used to attack both enemy artillery and maneuver. Given a conservative 20 to 30 counterfire acquisitions in one hour during any given NTC battle, it is the brigade staff that must determine which mission is more important: either contending with the tanks that are destroying the the lead task force's tanks at the point of penetration or attacking counterfire targets in sequence out of the TACFIRE mission queue.³⁰ Simply put, the complex tasks of sifting through acquisitions to determine which artillery target would yield the highest payoff, tracking the battle, clearing fires with the maneuver commander, and, finally, allocating the fires of a precious, limited resource must be conducted simultaneously. The

brigade staff does not have the number of qualified officers or noncommissioned officers to do this. The demands of a close battle and a counterfire battle can easily overwhelm the brigade staff.

Acquisition Shortfalls

The limitations of the brigade's acquisition systems further define the brigade's role as a reactive one. The brigade has none of the division's acquisition assets which can detect, track and attack the OPFOR DAG. The BLUFOR lacks both organic deep reconnaissance assets and a radar with a range capability that can acquire the DAG. The AN TPQ-36 radar, attached to the rotational brigade and under control of the DS artillery battalion, can detect and locate artillery to ranges of 24 kilometers, although greatest accuracy occurs between five and 12 kilometers.³¹ By using NTC and doctrinal positioning norms, the Q-36 can acquire the RAG's 2S1s and 2S3s but cannot acquire any system in the DAG unless the system is positioned forward in zone. With a rocket detection capability out to 50 kilometers, the division's Q-37 can detect the DAG, but only if it fires.³²

In addition to a radar which can react only to RAG fires, the brigade lacks adequate deep reconnaissance assets to visually acquire artillery groupings. The brigade does not have adequate organic deep reconnaissance assets to locate OPFOR artillery. Under the current table of organization and equipment (TOE) a motorized or heavy brigade has only one scout platoon, six combat observation lasing teams (COLTs) and its two GSRs.³³ By doctrine, brigades are expected to fight OPFOR battalions and regiments up to 15 kilometers from the FLOT.³⁴ In practice, however, the brigade deep capability extends only to the lead battalion's scouts, about five to seven kilometers forward of the lead task force. The brigade's six COLTs and ground surveillance radars (GSRs) must visually acquire their targets, but since they are tied to the maximum range of the brigade's direct support artillery for protection, the COLTs and GSRs are not viable sensing assets for either

the RAG or the DAG. Interestingly, under the Mobile Strike Force Concept for the Force XXI Army, a cavalry troop will be organic to a mechanized brigade, thereby providing the commander with nearly four times the reconnaissance and security capability that exists now.³⁵ Shortcomings in reconnaissance have been an oft-discussed topic in professional journals for the past decade, and many brigades have experimented at NTC with various force combinations to enhance this capability. Since an increase in the number of reconnaissance assets is unlikely in the near future, brigades must "task organize" or generate the assets out of its reserve battalion. By generating this asset, however, the brigade commander degrades his security capability elsewhere.

The NTC's rules of engagement (ROE) exacerbate the brigade's poverty in reconnaissance and surveillance assets. The NTC's ROE allow for visual acquisition of a notional artillery grouping, but the reconnaissance element must be within 1,500 meters of the templated notional grouping.³⁶ At this range, except under conditions of intervening terrain or poor visibility, an OPFOR or BLUFOR scout could visually acquire the grouping. If the template matches whatever location is shown for the same grouping in the TAF's SUN computer, then that reconnaissance element is credited with the acquisition, and the grouping can be attacked. An inherent OPFOR strength is that it employs actual divisional and regimental reconnaissance patrols to routinely penetrate the entire length and width of a brigade zone to locate BLUFOR artillery. The rule clearly favors the OPFOR, but this stems as much from U.S. doctrinal shortcomings as from NTC nuance. In Rotation 95-05, for example, a regimental reconnaissance element located the brigade's notional 155mm reinforcing battalion, which was positioned near the FLOT to provide close support for BLUFOR reconnaissance. Meeting all the 1,500 meter rule conditions, the OPFOR was able to destroy the battalion with the DAG's BM-21. Even if BLUFOR reconnaissance could penetrate to

within 1,500 meters to visually acquire the DAG, the brigade's 155mm battalions could not range the DAG, and the brigade would have to rely on the division's MLRS. Conversely, if OPFOR division or regimental reconnaissance identifies BLUFOR artillery, any OPFOR artillery grouping can range it.

The combination of NTC's reliance on reactive counterfire and rotational units' customary reluctance to form and employ deep reconnaissance to locate artillery incorrectly assumes that the Q-36 is the brigade's only artillery detection means. On Rotation 95-05's Training Day 9 (Deliberate Attack), the brigade commander wanted to use his battalion of attack helicopters to destroy the RAG to prevent the disruption of his attack the following morning.³⁷ The 11th ACR emplaced 18 visually modified Sheridans with elevated tubes to replicate a RAG 2S1 battalion at a location different from brigade's template. The template was correct because the brigade's Q-36 had several acquisitions from that location, but the TAF analysts and OPFOR did not communicate the location of the actual vehicles. The vehicles were in one place, while the computer's RAG icon and Q-36 were showing acquired grids in another. With no deep reconnaissance, the brigade could neither confirm nor deny the location of the RAG but relied on Q-36 acquisitions as the target location for its attack helicopters. The AH-64 Apache helicopters searched futilely for the RAG in what could have been a superb, lasting example of brigade level proactive counterfire. Reconnaissance in concert with the Q-36 could have paid significant dividends.

Range

Without a divisional proactive counterfire effort and a DIVARTY which responds only to DAG fires, the brigade is essentially left to its own devices for force protection. The M109A3, in the U.S. Army inventory since 1962, cannot compete with the RAG's 2S19, much less even range the DAG's BM-21s. With a maximum (unassisted) range of 18.1

kilometers, the M109 is outranged by the DAG's BM-21s and 2S5s.³⁸ The M109's range capability matches approximately that of the RAG's 2S1 and 2S3. For this reason the opposing systems are fairly matched in the NTC scenario. The 2S19, the 2S3's replacement, with a maximum range of 40 kilometers, however, is a viable threat even to the MLRS. NTC scenarios routinely place the 2S19 in its RAGs but do not fully exploit its capabilities. The relatively limited range of the M109A3, 155mm howitzer should determine its role as a purely close support weapon.

Range limitations have implications which reach beyond NTC. The U.S. was fortunate that the Iraqis failed to realize or exploit their significant artillery advantage during the 1991 Gulf War. While the MLRS's range was exceeded by Iraqi extended range munitions, the M109 was outranged by both conventional and extended range munitions. The French 155mm GCT self propelled howitzer, the 130mm towed M-46 gun, the GHV-45 and GCT all have conventional munitions ranges in excess of nearly 24 kilometers.³⁹ When applying the extended range capability to the equation, the GHV-45 and G-5 howitzer outrange the M109's rocket assisted projectile by 16 kilometers! To get within range of these systems during the pre-ground assault phase in mid February 1991, 1st Infantry Division moved its 155mm howitzers to within one kilometer of the FLOT. The howitzers fired their series of counterfire targets and displaced immediately upon end of mission. The raid technique was effective but demonstrated the M109's lack of adequate standoff capability against "obsolete" towed systems. An increased range capability to 40-50 kilometers would satisfy the role that NTC planners now try to make the M109A3 play as both a close support and counterbattery tool.

Consigned to absorb rather than initiate punishment, the brigades must somehow achieve a level of force protection that preserves enough combat power for actions on and beyond the objective. The DAG's direct support responsiveness and lethality contribute to a training

dilemma. On one hand, the DAG's presence in an MRD's zone or sector is reality, and its phase I and phase II chemical and FASCAM fires form an essential part of the NTC combat training experience. In addition, limited or doctrinally applied DAG fires in close support make the unit feel the bite of defensive phase III fires and constitute an effective tool for demonstrating the ramifications of failing to coordinate critical friendly zones, disregarding enemy observers, and practicing improper defile drills through restrictive terrain. On the other hand, repeated DAG BM-21 strikes along a BLUFOR's axis of advance can whittle a task force to 50 percent of its original combat strength before BLUFOR can close to direct fire range of an MRB defense. The DAG prevents the accomplishment of the mission essential tasks that are the index of maneuver combat readiness.

The DAG's role in repelling the attack has a very direct influence on the brigade combat teams' ability to train in its mission essential tasks. OPFOR records of fire show total assessments or BLUFOR combat vehicle kills that can reach as high as 40 to 50 percent of a unit's total beginning combat strength. The majority of these assessments usually occur before the attacking unit reaches direct fire range. During TD 13's deliberate attack in Rotation 93-08, for example, seven rocket and tube artillery strikes from the DAG vectored fully 67 percent of the brigade's combat potential before the first direct fire engagement. During Rotation 93-10, the DAG vectored 54 percent of the brigade's tanks and Bradleys 28 minutes before the brigade began its preparation for the assault. Brigades easily become combat ineffective even before the most important training events occur. Conducting the assault, actions on the objective, consolidation, reorganization and exploitation are all critical tasks that are the "most difficult and least practiced" of all combat tasks. However, each must be performed upon contact or in direct fire range of the enemy.⁴⁰ In his reminiscences about NTC, Brigadier General (Retired) Huba Wass de Czege

remarked that "exploitation has always been something we've said we're going to do (at NTC) but have never done it."⁴¹ DAG attrition of 30 percent or more of a task force drops its combat potential below the three-to-one force ratio minimum and, with it, usually the likelihood of any valuable training in the execution of the close assault tasks. While commanders are expected to display the experience and aptitude to adjust plans "on the fly," the loss of two company teams in a task force or 50 percent degradation in combat strength negate any reasonable chance of success against a well prepared defense.

The criteria for training success or training mission accomplishment at the NTC can be expressed in both empirical and subjective terms. Typically, a commander defines success as the effect he wants to achieve on the enemy or as a function of BLUFOR combat power remaining after the objective has been seized or secured. For example, for the Rotation 94-01 TD 13's deliberate attack, the commander defined success as consolidation on the objective with 75 percent combat power remaining.⁴² With a starting combat potential of 46 M1 tanks and 39 M2 Bradleys, success would be defined as the brigade having at least 75 percent of the 85 combat vehicles able to continue the mission after securing the objective.

The realities of training at NTC often deal rudely with these and similar expectations. The empirical data and the observer controller narrative accounts together convey an accurate picture of the effect of OPFOR artillery on the task force or brigade's ability to execute its mission essential tasks. In every case examined, where DAG fires inflicted significant losses on the BLUFOR, the unit was unable to achieve what the original intent defined as success. In two of the battles, the BLUFOR was able to begin breaching operations and achieve penetration but had insufficient combat power to continue the destruction mission, then consolidate and reorganize. In the TD13 deliberate attack in Rotation 95-07, only seven combat vehicles were

vectored by DAG fires, a loss which allowed the brigade to begin its assault with adequate combat power. The brigade achieved a breach, but OPFOR direct fires eventually defeated the effort. The following table illustrates the effect of DAG attrition on the brigade's ability to conduct actions on the objective:

Table 4.--DAG Attrition⁴³

<u>Rotation</u>	<u>Success/End State</u>	<u>Potential Assessments</u>	<u>Destruction/Results</u>
93-08 TD14	Destroy (75%)	28 M1s/38 M2s 67% losses	23% No breach
93-10 TD9	Penetrate MRB	15 M1s/2 M2s 37% losses before direct fire contact	45% No breach
93-10 TD13	70% Combat Power remains	20 M1s/38 M2s 54% losses 28 minutes before entering breach	74% 1 breach lane 7% ending combat power
94-01 TD13	Destroy (75%)	17 M1s/9 M2s 30% final loss assessed No OPFOR records avail	32% No breach
95-05 TD13	Destroy (75%)	28% final loss assessed No OPFOR records avail	61% Never reached objective
95-07 TD13	Destroy (75%)	3 M1s/4 M2s before direct fire contact	Marginal Success

Informed judgement indicates that these rotations fairly represent the standard BLUFOR deliberate attack scenario. DAG attrition inevitably plays a very significant role in the achievement of BLUFOR maneuver training objectives.

This is not to say that the units failed entirely because of BM-21 and/or 2S5 fires. As is often noted in take home packet executive summaries and in the after action reviews, units can and often do "fail by themselves." Failure to properly coordinate Q-37 radar coverage zones, failure to account for observers, especially those whom the OPFOR

inserts to trigger DAG strikes, or failure to integrate maneuver with obscuration often exacerbate DAG attrition. During a 24 rotation period from June 1992 through May 1994, the author witnessed only one successful deliberate attack in which the BLUFOR conducted a task force breach, penetrated, destroyed the defending reinforced company, then was able to effect some modicum of reorganization on the objective.⁴⁴ In this one instance of BLUFOR success, the task force accurately predicted OPFOR observer locations and employed artillery smoke in and around these areas to screen the task forces' movement across its LD and along the axis of attack. The task force then shifted the smoke to the point of penetration and on top of the adjacent enemy companies and maintained smoke cover throughout the assault. The smoke cooperated and compelled the OPFOR to reposition and expose themselves to the BLUFOR fires. Success is indeed possible, but conditions must be set to maximize training opportunities.

Lacking a divisional proactive counterfire effort, along with the staffing, acquisition and attack systems capable of countering the DAG, NTC orchestrates conditions which invite the brigade combat team's training failure. Yet, removal of any one or parts of the model would do perhaps as much violence to the training purpose as the perpetuation of the current state. Under the contemporary situation, the notional 52nd ID (M) has the capability of establishing conditions favorable to the brigade by prosecuting vigorous and violent counterfire actions which are absolutely within the bounds of all doctrine and would not only set the conditions for today's brigade combat teams but also for the force projection teams of the near future.

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³²Ibid., 3-2.

³³William K. McCurry and Joel R. Phillips, "Brigade Deep Operations, Task Organizing for Victory," Armor Vol CIII No. 4., (September-October 1993), 42.

³⁴U.S. Army, FM 71-3, 1-5.

³⁵U.S. Army Command and General Staff College, Mobile Strike Force, Concept of Operations (Ft. Leavenworth, KS: USACGSC, 1995), A-2.

³⁶National Training Center, Rules of Engagement (Ft. Irwin, CA: USANTC, 1993), 38.

³⁷NTC Take Home Packet Battle Summary, Rotation 95-05.

³⁸J.O'Malley, Artillery: Guns and Rocket Systems (London: Greenhill Books, 1994), 104.

³⁹Vollney B. Corn and Richard A. Lacquement, "Silver Bullets," Field Artillery Journal, HQDA PB6 91-6, (October 1991), 10.

⁴⁰David J. Lemelin, "Crisis in Battle: The Conduct of the Assault," Armor Vol CIV No. 4, (July-August 1995), 6.

⁴¹General (Retired) Huba Wass de Czege, Lecture delivered at the U.S. Army Command and General Staff College, 3 January 1996.

⁴²NTC Take Home Packet Battle Summary, Rotation 94-01.

⁴³NTC Rotation Take Home Packets.

⁴⁴Author's personal recollections, June 1992 through May 1994.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

This thesis has examined the how the OPFOR's Division Artillery Group influences brigade fire support and maneuver training at the National Training Center. In view of the NTC's purpose, this research has sought to assess the DAG's utility as a training vehicle by measuring its fidelity to validated former Soviet and U.S. doctrine and by explaining how the DAG facilitates or inhibits the training of brigade combat teams. An implicit objective was to assess the DAG's impact on the accomplishment of brigade-level training objectives at NTC. In the event this assessment revealed a negative impact, the thesis writer implicitly accepted the obligation to recommend that the NTC either discontinue use of the DAG as a training tool or suggest alternatives which would remain faithful to doctrine, yet maximize the unique NTC training experience. The conclusion is that the DAG should indeed remain on the NTC battlefield computer screen, but with some modifications to the scripted notional division deep and counterfire operations. With the exception of the DAG's more than ample contribution to the secondary effort's close fight and particularly its effect on BLUFOR maneuver forces, the NTC DAG model is faithful to former Soviet and OPFOR doctrine. However, the NTC needs to change how it scripts the notional divisional deep battle by making the DAG the target of an aggressive proactive counterfire fight. Introducing the proactive fight would enhance the merits of the proactive counterfire battle, limit the OPTEMPO of notional OPFOR and BLUFOR assets, and, most importantly, increase the scenario's training value to the brigade.

Despite arguments to the contrary, the NTC DAG is correctly portrayed in terms of tube strength and positioning. The problem is that the DAG contributes too heavily to the close fight. Unlike the BLUFOR's division MLRS, the DAG is clearly utilized primarily as close support asset in every deliberate attack scenario. The OPFOR varies from an MRD fire plan in the application of DAG fires by liberally invoking the MRD commander's authority to attack BLUFOR maneuver as the opportunities arise. In addition, as the mere two-battalion DAG of a secondary effort division, the NTC DAG routinely fires between 67 and 77 percent of its entire ammunition allocation in the OPFOR regiment's sector. This is nearly the same percentage expended by the regiment's own RAG, a direct-support, three-battalion organization which is augmented further by the regiment's 120mm mortars. As a result, during deliberate attacks, BLUFOR maneuver forces can be attrited to a level which requires observer controller intervention to ensure that the BLUFOR brigade or task force retains at least 50 percent combat power to facilitate a direct fire training event. Take Home Packet battle summaries show that the greatest DAG-inflicted attrition occurs even before the direct fire fight is joined and that losses accrue to a point beyond which the task forces are able to salvage some training in the most difficult but least practiced forms of maneuver. In summary, DAG employment in the close fight adversely affects the larger NTC training mission.

The real fault lies less in DAG overuse than in NTC's failure to exercise the inherent divisional responsibility of prosecuting the proactive counterfire fight. The OPFOR's divisional artillery is the stated high payoff target in U.S. doctrinal manuals, and the NTC has the means, albeit notional, to replicate the artillery. Yet, brigades have neither the sensing nor attack asset capabilities to assume the proactive counterfire responsibility. The Q-36 can acquire only RAG assets, and the M109A3 is bested in range by the RAG's 2S19, without

even mentioning the DAG's BM-21s and 2S5s. The counterfire battle is, for the present, the division's battle. BLUFOR brigades begin every battle against a full strength two battalion DAG that always inflicts the first losses on the rotational unit. The division counterfire fight becomes a purely reactive fight based on the firing rate of the DAG. The process ultimately devolves into a contest between OPFOR and DIVARTY computer stations within the fire support TAF and provides absolutely no training benefit to the rotational brigades. Yet, to restrict the BLUFOR divisional and brigade assets to a reactive counterfire fight is to ignore doctrine and to establish a dangerous precedent for future warfighters and planners. Within the larger context, the NTC fails to set the conditions for training success.

The answer to current dilemmas inherent in DAG employment would be to script the division's proactive counterfire battle. Scripting this battle into NTC rotations would reinforce sound doctrine and demonstrate to planners the value of the aggressive long range first strike capability of modern divisions. The DAG is the stated and obvious division deep attack high payoff target. Reduction of the DAG through attrition to proposed BCTP strength levels, i.e., one battery of BM-21s and one battery of 2S5s, would compel the MRD commander either to focus his remaining assets on the support of his main effort regiment or to authorize DAG fires only for the emplacement of special munitions. Reduction of DAG strength also provides the brigade with the necessary freedom of maneuver to mass its combat power at the decisive time and place. In BCTP Warfighters, both the 25th Infantry Division (Light) and the 4th Infantry Division (Mechanized) experienced tremendous payoffs in BDA and force protection, rendered by proactive counterfire. The benefit of proactive counterfire was also seen during the 1991 Gulf War, when U.S. and British artillery engaged Iraqi fire support systems in proactive counterfire, thereby allowing ground maneuver units to begin the assault virtually unmolested by Iraqi artillery. At NTC, MEL

traffic fabricated by the scenario team and transmitted to the player unit would convey a sense of success in the deep fight, and the results would be observed in correspondingly fewer DAG strikes in the BLUFOR zone of attack. Attacking the enemy's artillery first pays dividends. NTC could reinforce this absolutely critical lesson of modern conflict, a lesson which simply echoes the principles of surprise and audacity.

A scripted proactive counterfire battle would also reduce the burden of computer activity in the OPFOR and BLUFOR TAFs. DAG attrition from the beginning would reduce the number and frequency of counterbattery exchanges between the DAG and the DIVARTY MLRS. These "computer wars" provide absolutely no training value to the brigade combat teams. The process of Q-37 acquisition and the execution of fires against the DAG are completely transparent to the brigade and only consume the time and efforts of the BLUFOR and OPFOR fire support analysts. A reduction of TAF analyst involvement would allow these critical personnel to focus on the TAF's intended mission of monitoring the brigade deep and close fights to provide better feedback to the player brigade. In addition, a reduced DAG would obviate the need for many of the non-doctrinal positioning procedures routinely undertaken to achieve the minimum range to facilitate a counterbattery fight. The proactive search for and destruction of the DAG would support the TAF's primary training support mission.

Finally, a proactive counterfire battle would increase the scenario's training value to the brigade. Effective proactive counterfire would reduce the DAG to a tube and launcher strength level at which it could no longer support the secondary effort regiment for an extended period. In reducing the DAG to one battery of BM-21s and one battery of 2S5s, the OPFOR commander would have adequate assets to emplace his special munitions in phases I and II of the defensive fire plan but not enough weapon systems and ammunition to participate in a lengthy and responsive close support battle for the OPFOR supporting

effort regiment. Retention of two batteries allows the OPFOR to emplace its chemical and FASCAM targets but forces the OPFOR commander to focus his remaining assets on the main effort regiment. The DAG can still portray its phase I and phase II fires; meanwhile, the BLUFOR has the opportunity to see the effects of a divisional artillery group and train in chemical defense measures and minefield breaching, while fielding enough soldiers and combat systems to enter the direct fire fight and train to the critical tasks of the close assault. Decreasing the number of BM-21 strikes does not degrade brigade combat team training as much as a failure to facilitate the practice of mission essential tasks. Just as the deep proactive counterfire battle establishes favorable conditions in war, so also the proactive counterfire battle should set training conditions at the NTC.

The divisional deep battle and a proactive counterfire effort against the notional DAG afford the best means of maximizing the training benefit to brigade combat teams. This emphasis not only reinforces doctrine, it is doctrine. To remove the DAG completely from the NTC threat model is to ignore a reality of the mid to high intensity combat environment which a force projection army is likely to face. Removing only the DAG/DIVARTY reactive counterfire battle denies the BLUFOR of the value of the proactive divisional counterfire effort. Scripting the proactive counterfire battle into NTC scenarios allows BLUFOR brigades to see and appreciate the effects of OPFOR firepower, yet provides a force protection mechanism which facilitates the execution of close assault tasks which are critical to sustaining combat readiness. The maxim that "the next war will most likely be fought by a brigade commander" speaks to the need for emphasizing the doctrinal systems and the means which optimize the most essential yet seldom practiced maneuver tasks.

The focus of this thesis precluded an examination of the related significant issues of a DIVARTY Fire Support Element and

considerations for replicating OPFOR artillery at NTC. Although scripted MEL traffic is the easiest solution for portraying a notional deep operation against the DAG, such a solution provides no training value to the BLUFOR and taxes an already manpower constrained TAF. Allowing U.S. divisions to form a DIVARTY Fire Support Element or Deep Operations Cell in the TAF would provide invaluable training for both the DIVARTY staff and the BLUFOR brigade combat team and eliminate the artificiality of MEL traffic. The integration of attack aviation with general support artillery and electronic warfare could be planned with realistic time and spatial analysis devoid of the scenario writer's customary hand-wave solutions. Success or failure of the division's executed plan would impact directly on the brigade close fight. Conversely, the introduction of an actual division cell would provide a unique challenge for OPFOR planners to integrate doctrinal DAG movement and positioning with air defense assets to maximize force protection. The problem is that the instrumentation support, equipment resourcing, and the space management for an additional 20 man TAF would require considerable cost-training benefit analysis.

Another option to consider is the employment of State National Guard artillery to replicate OPFOR artillery. Pre-positioning of a battalion or even a battery of M110 eight-inch self propelled howitzers would do much to resolve the myriad problems associated with a half notional, half actual BLUFOR-OPFOR artillery contest. Rotating National Guard artillery personnel, with an accompanying command and control element, could replicate doctrinally correct DAG movement and positioning and train extensively in dry fire, occupation, displacement and tactical movement. OPFOR would experience the same employment constraints due to maintenance and human error as the BLUFOR artillery. Since the M110s resemble the DAG's 2S5, actual employment of these pieces would provide excellent training for attack aviation, reconnaissance and intelligence analysis using the new Unmanned Aerial

Vehicles (UAVs). The training payoff seems especially attractive for aviation-artillery attacks against the DAG, when an attack helicopter company or battalion is placed under the operational control of the ground brigade. Fiberglass appliques to the M110s could be fabricated to make the howitzer resemble the 2S19, which may appear in either the DAG or RAG. Although certainly a costly venture, the prospect of actual OPFOR artillery on the NTC battlefield promises substantial training dividends.

In sum, the OPFOR/BLUFOR contest reveals the importance of understanding the relationship among experience, theory, and doctrine. The NTC provides the premier near-combat experience: DAGs fire, CATIES whistle and explode, lights blink, people and vehicles cease to function. After action reviews capture the experience and correlate cause with effect. Theory helps us distill the experience into a useful information base which provides the raw material for categorization, reflection, and foresight. Doctrine, though imperfect because peacetime simulations lack the essential finality of immediate lethal feedback, is shaped by experience. The more realistic the experience, the better our doctrine and the more prepared we become for the requirements of the next war. The British military historian Michael Howard once remarked that whatever doctrine we are working on now is probably wrong, but what matters is our capacity to "get it right" when the moment arrives. It is the task, then, of our leadership to ensure that our doctrine is not "too badly wrong."¹

Endnotes

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